

COAST ARTILLERY JOURNAL



COLONEL H. B. GRANT

Commanding the 15th C. A. (H. D.), whose regiment won the U. S. Coast Artillery Association trophy for the training year ending June 30, 1932.

September-October, 1932

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The Coast Artillery Journal

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THE COAST ARTILLERY JOURNAL

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MAJOR STEWART S. GIFFIN, C.A.C., Editor

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THE UNITED STATES COAST ARTILLERY ASSOCIATION



"The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of materiel and methods of training, and by fostering mutual understanding, respect and cooperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserve and Reserve Officers' Training Corps."



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- a. Civilians who have demonstrated their interest in national military preparedness.
- b. Persons who have rendered distinguished services to the Association or to the United States."

Notes of the Coast Artillery Association

Trophy Winners

THE U. S. Coast Artillery Association is pleased to announce the winners of the Association trophies for the training year ending June 30, 1932, as follows:

For the Regular Army—The 15th Coast Artillery (HD), commanded by Colonel H. B. Grant, stationed at Fort Kamehameha, T. H.

For the Reserve—The 955th Coast Artillery (AA), commanded by Lt. Col. J. R. Sweitzer, stationed at Duluth, Minn.

The award of the Regular Army Trophy is dependent upon the scores made in target practice. The 15th was fortunate in having as battery commanders the following: Captain B. P. Foster, Commanding Battery A; Captain LeR. Lutes, Commanding Battery B; Captain A. L. Lavery, Commanding Battery C. There are but three firing batteries in the 15th and all were rated "Excellent." The Association also desires to congratulate Major Frederic A. Price, who commanded this battalion until May 6, 1932, as well as Major Berthold Vogel who relieved him on that date. These batteries not only were rated "Excellent" upon the superior show made during their regular target practices but during the year participated in experimental long range firings using aerial radio compass methods of position finding and observation.

The Reserve Trophy was won by the 955th Coast Artillery (AA), under command of Lt. Col. J. R. Sweitzer. The two regiments who came out second and



third also deserve mention for their excellent effort. They were: The 514th C. A. (AA), stationed at Schenectady, N. Y., commanded by Major N. E. Devereux (Major J. C. Haw, Unit Instructor). The 974th C. A. (AA), stationed at Muskogee, Okla., commanded by Major Ellsworth Guy (Major W. S. Fulton, Unit Instructor). The victory of the 955th was decisive, however. In praising the excellent work of this regiment it should be mentioned that Lt. Col. Frank E. Tenney, the active and energetic executive, and Captain W. H. Sweet, the diplomatic and inspiring unit instructor, are the two men behind the guns who urged the members of the regiment forward to this outstanding accomplishment. In this regiment the name of 2d Lieut. R. J. White leads all the rest in the number of extension course lessons submitted. Furthermore, Lieut. White led the regiment in the previous year.

The Reserve Trophy is awarded on the basis of ex-

(Continued on page 395)



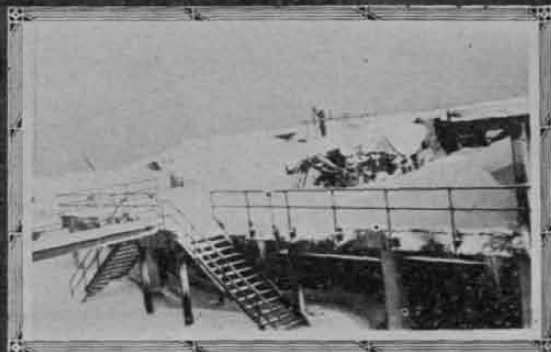
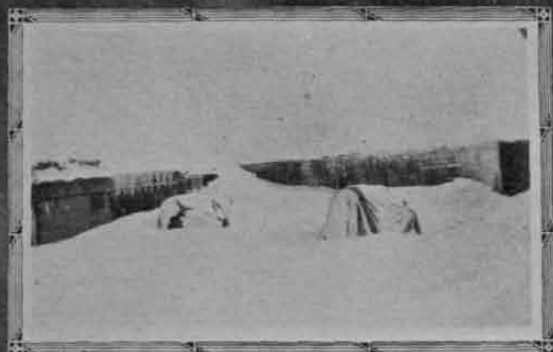
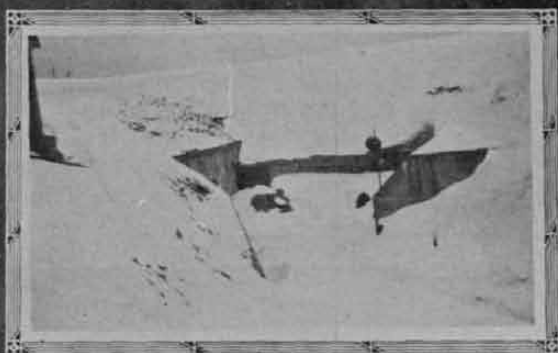
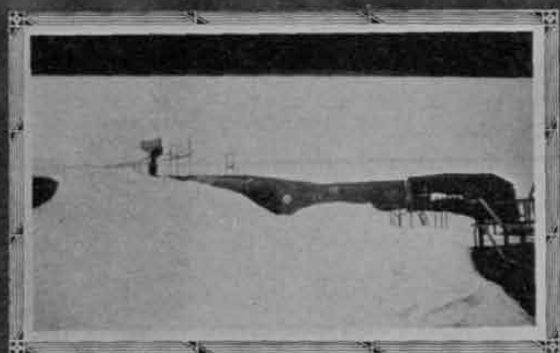
Capt. Le Roy Lutes
Comdg. Battery A, 15th C.A. (H. D.)



Capt. Valentine P. Foster
Comdg. Battery B, 15th C.A. (H. D.)



Capt. Arthur L. Lavery
Comdg. Battery C, 15th C.A. (H. D.)



WINTER SCENES AT FORT PREBLE, MAINE.

These scenes will soon be observed at all our northern posts. Beautiful as they are they bring no joy to the hearts of the hard working maintenance detachments whose hardest battles against rust and corrosion take place during the winter months.

Field Training of the 52d Coast Artillery (Railway)

By Lieut. Col. Lewis Turtle, C. A. C.

THESE maneuvers, which involved Regimental Headquarters, the Band, the Headquarters Battery, Headquarters of the 2nd Battalion, and Batteries C (two 12-inch mortars) and E (two 8-inch guns), all stationed at Fort Hancock, New Jersey, had their inception in a letter from the Office of the Chief of Coast Artillery. It invited attention to the fact that the adequate training of a railway Artillery unit should include a journey by rail, the emplacement of the equipment of the organization, and target practice from the newly established positions. The letter also stated that preliminary investigation indicated "that a satisfactory movement could be made and firings held from some point in the vicinity of Lewes, Delaware."

Accordingly, estimates were made of the funds necessary in connection with an encampment at Lewes; and that neighborhood which had been visited by officers of the Regiment in October, 1929, was again reconnoitered. In order to emplace our guns and mortars it would have been necessary to pass over a piece of track belonging to the Consolidated Fisheries Company and, as permission to do this was not forthcoming, plans to use the Lewes area were abandoned.

Evidently another locality had to be found. In doing this we made a reconnaissance of the eastern coast of New Jersey wherever a railroad runs close thereto. While we greatly desired a place to which our armament could reasonably be ordered, in other words one that could readily be woven into a realistic military problem, the first consideration was to avoid injuring civilian property by gun-fire. Excellent war positions, free from shipping, for railroad artillery charged with the defense of the entrance to Delaware Bay were found near Cape May. These could easily be camouflaged against aerial observation and provided with long base lines of suitable direction to serve efficiently against all targets within range, whether these were in the Atlantic Ocean or the Bay. However, as nearby civilian establishments precluded target practice, none of these positions was favorably considered for occupation. The most suitable place on the entire coast for our firings—Fort Hancock alone excepted—was found to be between Wildwood Crest and the entrance to Cape May Harbor, also known as Cold Spring Harbor. The Pennsylvania Railroad connects these two localities and, as it nears the latter, forms a loop, 550 yards in length, furnishing a turn around for railroad trains and serving the Cold Spring Supply Company, a fishing concern with a wharf, an ice plant, and other structures. A straight piece

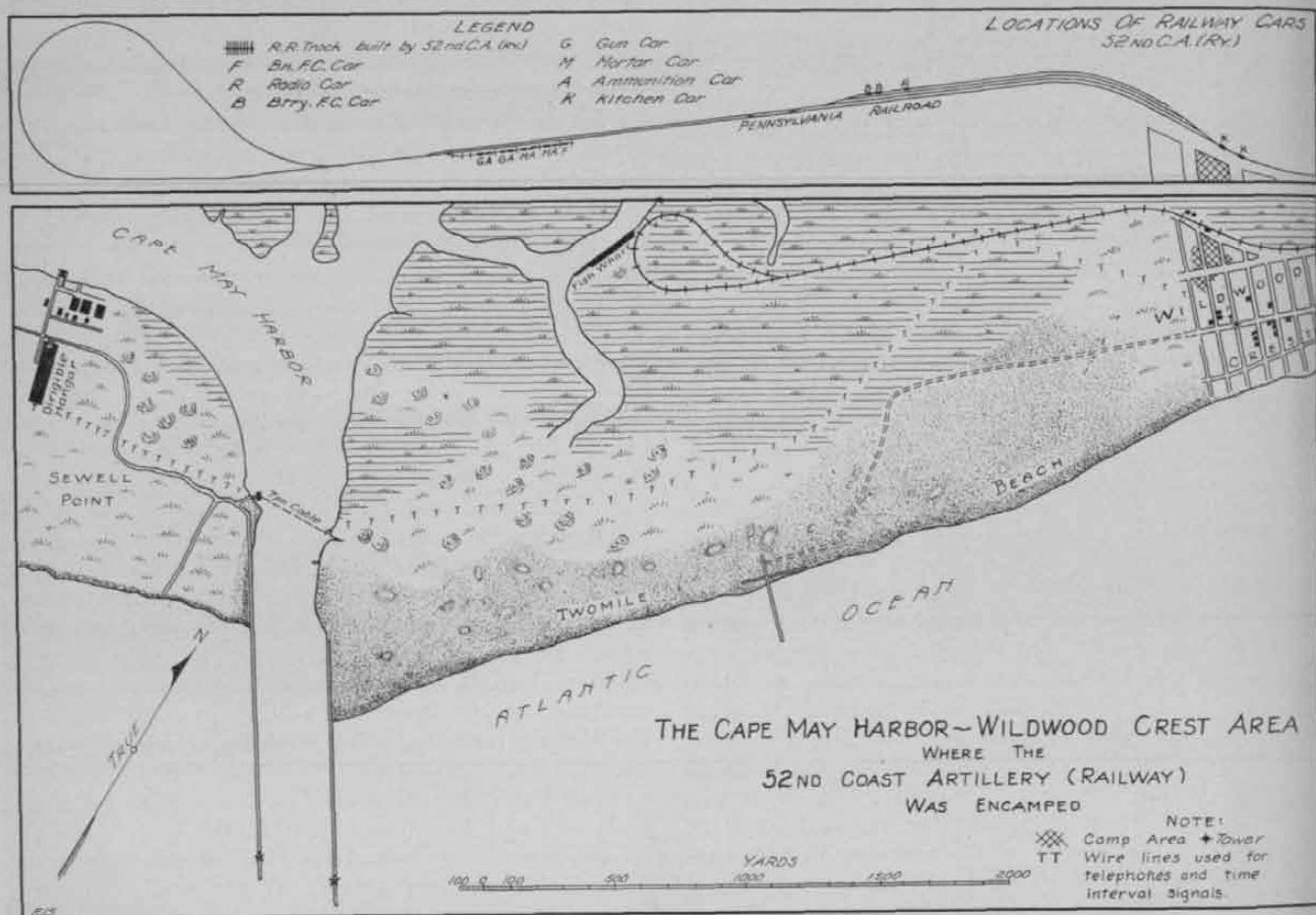
of track connects the loop to a curve, 1,300 yards to the northeast, where there are sidings. A cinder road, beginning at the fish dock, skirts the north side of the loop, then crosses the track and, on the ocean side thereof, runs alongside the railroad embankment, which rises 18 inches above the road, until junction is made with the street system of Wildwood Crest. Both the road and the embankment rest on a fill, several feet thick, made through dredging operations and consisting of sand, finer matter, and some shells.

While it was evident that the ground adjacent to the loop was not much above sea level, this ground was dry, except for a puddle or two said to be due to a recent rain. Information, apparently reliable, was to the effect that sea water never reached the immediate vicinity of the loop and that the terrain there remained firm. We came to the conclusion that the guns and the mortars could be emplaced on the loop, with good fields of fire, only moderate inconvenience to railroad traffic, and non-interference with the cinder road and adjacent telephone lines.

After we returned to Fort Hancock the question of using the loop for our firings was taken up with the proper railroad officials and inquiry was made as to the sufficiency of the foundations upon which it rests. Becoming suspicious of the latter, we made another trip to the Wildwood Crest area where we were met by Mr. Spencer Danby, a representative of The Pennsylvania Railroad. On this occasion the tide was high and a strong east wind had raised the water level of Cape May Harbor. As a consequence, large pools of water had formed within the loop, while all the ground in the immediate vicinity was soft from seepage and capillary action. It was evident that no further effort to use the loop should be made and that the best solution was to emplace the armament on a piece of track to be built on part of the straight stretch of cinder road. In accordance with this decision, a position for tactical No. 1 gun was located about 270 yards from the railroad loop, while northeast of this position, at forty yard intervals, positions for the other gun and the two mortars were chosen. Pits sunk on the ocean side of the road and near where outrigger floats would rest struck water about eighteen inches below the surface of the ground. Mr. Danby agreed to these locations and stated that the railroad would transfer automobile traffic to an old road bed on the other side of the railroad embankment and remove those telephone poles and otherwise route those wires liable to be injured by our operations.

The gun and the mortar positions having been decided on, the next problem was to provide for proper observation. Twenty-five hundred yards southwest of the location chosen for our artillery is Sewell Point, embracing a U. S. Naval Air Station with a dirigible hangar and a landing field. This reservation is in use by Coast Guard Section Base Nine. The Navy and the Coast Guard furthered our plans in every way possible and were always not only willing but anxious to help. Later, during the exercises, we were permitted to place observers and spotters for both firing batteries on top of the hangar, where they were 116 feet above the ground. The stations were set up on the roof, seaward of the monitor, thus securing

which, from southeast to southwest—the most likely field of fire—was hidden from view by sand dunes covered by bushes. It was highly desirable that the fall of projectiles should be observed from the firing points and well nigh essential that the safety officer should have his post there. Hence it was that preparations were made to construct two observation towers, one for each firing battery. In this connection, the Wildwood Crest-Cape May Harbor area was surveyed and mapped, special attention being paid to the locations of the sand dunes and their elevations, vegetation included, above the position chosen for our artillery. The map enabled the heights of the towers, which were built at a later date, to be determined. Although



some protection from the wind and an uninterrupted view from the coast of Delaware on the south to far up the New Jersey coast on the north. The men lived in a guard room of the hangar and boarded at the Coast Guard mess. The other observers and spotters and the regimental command post were established 1400 yards northeast of our guns and mortars, at an elevation of about thirty feet, on the balcony of a tower built for real estate purposes and kindly loaned us by Mr. John J. McDevitt, Jr., of Philadelphia. Our main base lines were approximately 4560 yards long while, for one-pounder subcaliber firing, a 1425 yard base line, extending from the guns to the tower, was used.

A sandy plain, some 1000 yards wide, stretches between the firing positions and the Atlantic Ocean

differing somewhat in design, they are quite similar. When needed, these knockdown structures may be erected on railway cars in slightly more than an hour and a half. Two-inch planks are used in the floors, while the vertical, the diagonal, and the horizontal members consist of angle irons. The whole is bolted together and to the car. One tower is stiffened by gussets while each is provided with an iron ladder and a flag pole. Steadiness was increased in one of two ways. Either the body of the car was jacked up until the weight was supported by the jacks or, after the car body had been raised as just mentioned, blocks were inserted between said body and the side frames of the trucks, the jacks were withdrawn and the weight, instead of passing to the springs, was transmitted through the blocks to the side frames

The towers furnished vantage points for observation, even enabling a target close in-shore to be seen, and have since proved valuable during record service practices at Fort Hancock.

Mr. McDevitt, who is president of a realty company that owns a large tract of practically unoccupied land between Wildwood Crest and Cape May Harbor, stated that we might establish and conduct a camp anywhere on that piece of property and generously agreed that no claim for rent would be made. A camp site was chosen northwest of the real estate tower. This location was excellent as it was reasonably near the gun and mortar positions, adjacent to railroad tracks upon which our kitchen cars could be spotted and thereafter remain undisturbed, provided with sidewalks and paved roads, convenient to a main from which water for all purposes could be taken, and sufficiently far from dwelling houses to avoid annoying their occupants.

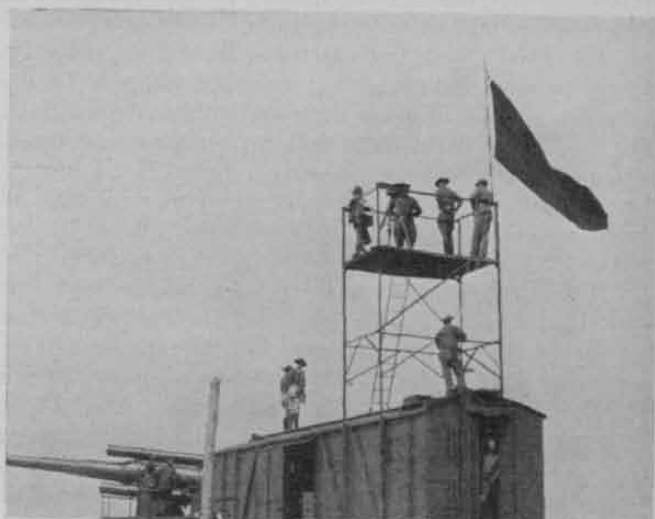
There were many matters of importance to take up with the railroads. They were informed of the maximum car and truck loads of our equipment and made measurements to determine clearances. As there was a possibility that it might be desirable to send the armament train over an electrified section of track, care was taken to find out whether our materiel would make contact with the third rail. Finally we were notified there would be no difficulty in delivering our cars at Wildwood Crest whatever the routing. In so far as it was necessary, we familiarized ourselves with railroad rates and classifications, rules affecting the transportation of explosives, and the requirements governing the make-up of trains. After a great deal of correspondence it developed that the usual charge of eastern lines for the transportation of a railway mount is based on seventy percent of the actual weight, at the fifth class rate. It was learned that smokeless powder for cannon and subcaliber ammunition belong to the category of "military impedimenta" and that either or both of these items may travel in a car carrying other articles so classified. Search indicated that there is nothing to prohibit the inclusion in a train of both personnel and Coast Artillery ammunition.

After the local quartermaster had inspected our rolling-stock to assure its serviceability for travel, the first carrier, The Central Railroad Company of New Jersey, did likewise and replaced by new the air hose, all of which was more than two years old. Mr. B. H. Hudson, of The Pennsylvania Railroad, the chief railroad official with whom we dealt, spared no trouble or expense to have everything satisfactory. It was agreed that neither switching nor demurrage charges would be made, that our cars would be spotted at points previously specified by us, and that, at no cost to the government, the Railroad would provide and deliver at the firing positions 60 one hundred pound rails, each 33 feet long, and sufficient ties, cinder ballast, and other material to enable the construction of about 600 feet of track. Also, we were loaned additional sleepers for use under the gun and the mortar cars.

Upon request, the post quartermaster obtained the

routing order for our railway movement and the initial carrier supplied a time table and let it be known exactly how our cars would be handled while en-route. We ascertained that the armament train would be reversed at Red Bank, N. J., and that the south-west end of the track to be laid by us would be connected to The Pennsylvania Railroad. A careful study was made of the routing and of the track layout in the Wildwood Crest-Cape May Harbor area. The yardmaster there was informed where each of our fourteen cars should be spotted and was carefully questioned as to the manner in which this spotting would be done.

As wireless communication with vessels towing targets and with airplanes engaged in spotting had to be provided for, one of our fire control cars was converted into a radio car. As a precautionary measure, two complete radio sets, SCR-136, with power units, PE-41, were installed within the car. The radio sets were fastened to the side walls, directly across from



Observation Tower of Battery E, 52nd Coast Artillery (Railway). Mounted on an Ammunition Car.

one another, near one end of the car, while the power units were placed four feet apart at the other end. As one of these had the throttle arm leading to the carburetor broken during the movement to Wildwood Crest, it is fortunate that there was a second power unit. Also in the car were three field telephones, type EE-5, one of which was for general use, while the others connected with the fire control cars of Batteries C and E, respectively, thus making it possible promptly to relay to the plotting rooms of those batteries the results of spotting done from a plane. Needless to say, the noise and the vibration of either of the power units made telephonic conversation and the receipt of radio messages almost out of the question. To obviate this trouble, these units were mounted on celotex while, across the end of the car containing them, was placed a partition consisting of three thicknesses of $\frac{1}{2}$ -inch celotex, each separated from the other by a 1-inch air space and nailed to uprights that were staggered to minimize vibration. Moreover, immediate contact between the car and the partition was prevented by strips of celotex. In order to make a

finished job and to protect the sound proofing material, the partition was covered by wainscoting. The wall has a door, patterned after that of an ice box and provided with insulated stripping to insure a tight fit. As the measures taken decreased the noise and the vibration tremendously the radio car gave good service during the field training and, subsequently, at target practice.

Several months before the maneuver took place Captain Willard W. Scott was notified that he would be in charge of an advance party to establish the camp and do certain other work prior to the arrival of the main body. He made estimates showing personnel—two lieutenants, who were promptly detailed to assist him, one medical officer, 87 enlisted men—and transportation, tents, and other articles required. A large scale map of the camp site was drawn and on it the tents, the latrines, the water system, and the shower baths were located. All necessary pipe and other plumbing supplies were accurately listed with the idea, duly carried out, of ordering these locally upon arrival at Wildwood Crest and obtaining immediate delivery. Projects were prepared for running surveys to determine lengths of base lines and other needed data, for putting in wire lines, and for constructing track.

On May 1, 1932, we received, from Headquarters Second Coast Artillery District, the general situation. It stated that war had existed between the United States and an overseas coalition since the fifteenth of the preceding month, that the bulk of our fleet was contained in the Pacific by a hostile fleet, and that an enemy expeditionary force was thought to be concentrated and ready to sail, under convoy, from a certain European port. That part of the 52nd Coast Artillery (Ry) stationed at Fort Hancock was cautioned to be prepared to move to the vicinity of Cape May, N. J. A special situation, received on May 19, contained the information that there was reason to believe that the expeditionary force, protected by a strong fleet, could reach the Delaware Bay area, its probable destination, by June 2. Accordingly, a regimental field order was issued directing the advance party to proceed on Saturday, May 21, to Wildwood Gables, the real estate development adjacent to and just southwest of Wildwood Crest. The order charged the advance party with:

Establishing a tent camp for themselves and the remainder of the command.

Laying all requisite firing track.

Procuring data and placing bench marks to enable the prompt establishment of base lines, the setting up of observing instruments, and the determination of the location and orientation of each gun and mortar.

Making arrangements to permit the heights of gun trunnions above mean low water to be quickly found. (Fortunately there was a tide gauge at Sewell Point.)

Providing all lines of communication needed for fire control and direction.

The movement of the advance party was made in

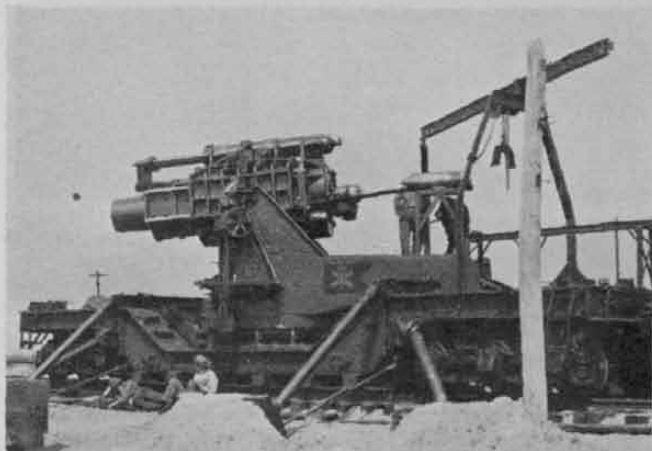
motor vehicles, most of which, fine new 3-ton Q.M.C. trucks, were furnished by the 62nd Coast Artillery (AA). These made the 140 mile run to Wildwood Gables in six and a half hours. Upon arrival the men promptly began the erection of tents, the installation of plumbing, and the digging and lining of pits for use in connection with knockdown latrine seats, brought from Fort Hancock. Hardly had they started this work when a summer resident of Wildwood Crest visited the camp to object to our projected artillery target practice, although the mortars were separated from the nearest building in the town by 1200 or 1300 yards. The guns were even more distant. He stated that he believed such firing would badly rack his house and break the glass of a skylight covering a patio. A little later in the day he took the matter up with me over the long distance telephone. The fact that firing was scheduled had been common knowledge in Wildwood and vicinity for a number of months and the only protest received had been that of the owner of the ice plant at the fish dock, who was afraid that the concussion would cause his motors to stop. He withdrew his opposition after it had been explained that motors continue to work even when attached permanently to gun carriages and that a federal law covers the adjustment of certain classes of claims for damages occasioned by heavy gun-fire. However, the fears expressed to us on May 21 were not to be quieted and other people protested, some to me, some even to the War Department. By the afternoon of the following day it appeared probable that the dissatisfaction of a few property holders in Wildwood Crest would cause the cancellation of the railway movement. In order to prevent useless expense, I telephoned Captain Scott to complete all projects necessary for the health or comfort of his command but to suspend all others involving the expenditure of United States' funds or the considerable alteration of borrowed property, for instance the construction of track. On May 26 it was learned that the War Department had decided that the movement to Wildwood Crest would be made but that, while there, the regiment would fire nothing more devastating than subcaliber ammunition. Consequently, Captain Scott was directed to push to completion all work specified in the field order.

One of the many interesting problems to be solved was to provide wire lines, for telephonic communication and for time interval signals, between the dirigible hangar and the main switch board in the battalion fire control car, the latter to be spotted 400 yards northeast of the railroad loop. An all-land line was out of the question for it would have been thirteen or fourteen miles in length. The entrance to Cold Spring Harbor is between stone jetties, slightly less than 300 yards apart, each with a lighthouse near the outer end. Farther on are several wharves. The bottom of the entrance is of sand while the maximum depth, which is attained gradually, is thirty feet. There is considerable traffic. Before the advance party left Fort Hancock decision was made to connect two wharves, on opposite sides of the entrance, by a seven pair aerial and underground lead covered cable, type WC-413

and, as this involved the use of navigable waters, a letter was written requesting that higher authority approve the plan. The original idea was to pay the cable out from a reel mounted on a Coast Guard motor boat. A trial run, using field wire, indicated that the strong current would prevent the running of a straight and steady course and probably cause a kinking of the cable or the puncturing of its lead sheath. It was then determined to coil the cable on shore in a large figure eight. One end of this was made fast, while the other, when the tide was at ebb on May 30, was lashed to the boat which then proceeded from one pier to the other. The cable uncoiled without a kink and in ten minutes was ready for connection, through junction boxes, to field wire. The condition of the cable, which was tested twice daily, remained excellent. Had serious trouble developed, an improvised seven pair cable of field wire, type W-40, would have been laid. After the conclusion of the exercises near Wildwood Crest, an L boat was used in the recovery of the cable, which proved to be undamaged. This operation took twenty minutes.

One mission of the advance party was to construct a railroad spur for the battalion fire control car, two mortar cars, two gun cars, and four ammunition cars. The straight piece of track was built, as already agreed, on the cinder road, which was found to be so nearly level and so well packed as to require no attention. Stakes, to mark the four pintle centers and the axis of this part of the spur, were driven in the road at such a distance from the railroad embankment as to cause the most important outrigger floats to rest against it. As soon as the stakes were in place, each firing bed was constructed of well formed and heavy ties separated from each other by intervals of ten inches. Especially heavy sleepers were placed so that they would be directly under the screw jacks of the mortar cars. The other ties were then put approximately in position, the spacing being increased to a foot and a half. While some men were performing the operations last mentioned others were laying and bolting the outer rail, meanwhile accurately spacing and aligning the ties. Spiking began as soon as the first two lengths of rail had been connected by means of joint plates and bolts. Such sleepers as were not firmly against the rail were held up by heavy crow bars, using the adjacent timbers as fulcrums. When the first eight sections had been spiked, work began on the inner rail. As soon as the bolting of the first few lengths had been completed the proper distance between the outer and the inner rail was assured and the latter was spiked to the ties. As fast as the remaining rails could be bolted they also were made fast to the sleepers. All rail joints were staggered, as were the spikes on each rail. Care was taken to keep the inside and the outside spikes of one rail in line with the corresponding spikes of the other; also to see that each junction between rails fell in an interval between ties. All spiking having been done, a sergeant, from a distance of about one hundred yards, directed the lining of the track. Ballast was then thrown wherever a tie was too low, the track was

raised at those points by two track jacks, and tamping was resorted to in order to bring the rails to proper grade. The horizontality of the firing beds was tested by a track level and the beds were ballasted to within two inches of the upper surfaces of the ties. In order to cause the minimum inconvenience to The Pennsylvania Railroad, connection to their track was made only a few hours before the armament train arrived. This operation, in which neither a switch nor a frog was used, was performed by converting thirty yards of straight main line track into a curve which was then united to our track, as will be described. Such ballast as would have impeded the movement of this track was shoveled away, the end adjacent to ours was unbolted, and the loosened part was simply shoved and lifted into the desired curve. The rails and the ties were treated as a unit, without the removal of a spike. The result was attained gradually, work starting at the free end, proceeding towards the other end, and being repeated until the track took the form required. Considerable ballast was necessary as the



12 inch Railway Mortar Emplaced for Firing.

main line track was eighteen inches above ours. The work outlined above did not complete the siding, for the curve did not quite reach the recently built track. Parts cut from two rails closed this opening. Each of these sections was obtained as follows. At the place where measurements showed the rail should be broken, the upper surface of its base was indented, by means of a cold chisel, to a depth of one fourth inch. That end of the rail to be used was then bolted in place and temporarily spiked to the sleepers. To effect the break, the other end was then pried to one side and, on the same side, a few sharp blows on the web were struck with a maul at the point where separation was desired. In warm weather, the work may be facilitated by chilling this point with ice. The spikes were then withdrawn and the section of rail pushed into position and fastened to the ties, thus bridging the gap.

From a special situation, delivered on May 29, it was learned that the enemy fleet conveying the expeditionary force, had been reliably reported as sailing for the Delaware Bay area in time to arrive there on June 2. In order that we might assist in the defense

of that locality we were ordered to proceed, by rail and motor transportation, on June 1 to positions south of Wildwood Crest and to be prepared to open fire by 8:00 a.m. of the following day.

The military situation was communicated to each of our officers, the completion of the loading of the railway cars was directed, and all were warned of the impending movement and told to be ready for it. Other matters now received attention, among these a field order covering the movement, a time table governing the speed of the heavy motor column, and memoranda dealing with baggage and the question of uniform. Fourteen officers of the Coast Artillery Reserve, all



General Gulick and Colonel Fergusson inspecting 8 inch railway gun at Wildwood Crest, N. J.

but one of whom belonged to the 602nd Coast Artillery (Ry), having reported for fourteen days active duty, were attached to regimental headquarters and to batteries.

The cars having been loaded, the armament train was made up to leave the post in the order specified below:—

1. Battalion fire control car.
2. Ammunition car for mortar No. 2.
3. Mortar car (tactical No. 2).
4. Ammunition car for mortar No. 1. All mortar subcaliber ammunition was in this car.
5. Mortar car (tactical No. 1).
6. Ammunition car for gun No. 2.
7. Gun car (tactical No. 2).
8. Ammunition car for gun No. 1.
9. Gun car (tactical No. 1).
10. Radio car.
11. Fire control car, Battery C.
12. Fire control car, Battery E.
13. Kitchen car, Battery E.
14. Kitchen car, Battery C.

Not only was this arrangement in accord with the regulations both of the Army and the railroads but it assured easy spotting of the cars at destination. In assembling the cars, those of the mortars were so coupled as to cause the muzzles of the pieces to trail until the train reached Red Bank. Hence, no reversal of these cars had to be made at destination in order

to cause the quick loading devices to be of service in the most important parts of the field of fire.

The armament train, with one officer and ten enlisted men of the regiment board, left Fort Hancock, at 8:07 a. m., June 1, 1932. It is believed that it would have been somewhat better had the number of soldiers been increased to twelve. This would have provided one for the radio car, one each for the fire control cars, and two to ride with each gun and mortar. That same morning motor transportation containing the other officers and men, with personal baggage, bedding, and rations, had cleared the hospital, Fort Hancock, at six o'clock, bound for Wildwood Crest, where the trucks were unloaded and a hot meal was eaten at 1:00 p. m.

In the afternoon Major General John W. Gulick, Chief of Coast Artillery, Colonel Frank K. Fergusson, C. A. C., Commanding the Second Coast Artillery District, and members of the staff of the Second Corps Area Headquarters arrived and spent the rest of the day and most of the forenoon of the next in observing and inspecting the regiment, which had 25 officers, including 14 reserve officers, one warrant officer, and 288 enlisted men in camp.

Later in the afternoon of June 1 the armament train pulled into camp and, in 20 minutes, had been unloaded of those things that belonged there. The train then proceeded to the firing spur where, in the order named, the battalion fire control car, the ammunition car of number 2 mortar, and that mortar were spotted at 4:55 p. m. Then the six other cars assigned to the spur were dropped, each in its place, the last of these, number 1 gun, at 4:58 p. m. The radio car and the two battery fire control cars were spotted at 5:06 and 5:08 p. m. on a siding 600 yards northeast of the firing position. Fourteen minutes later both kitchen cars were in place on the edge of the camp.

The emplacement of the artillery was immediately begun and pushed to completion as were all other preparations necessary to repel the hostile fleet. The observation tower of Battery E was erected on the ammunition car of number 1 gun while that of the other battery, to escape severe concussion, was placed upon the battalion fire control car. To provide for shifting mortar projectiles there was laid a wooden runway upon which this ammunition could have been rolled from one piece to the other. As the 8-inch projectiles weighed only 200 pounds, no difficulty would have attended their transfer. Machine guns were set up for anti-aircraft defense and assigned missions with the idea of protecting our cars and encampment whatever the direction of approach of hostile planes. The battalion command post was established in the battalion fire control car, while, five minutes thereafter, at 5:40 p. m., the regimental command post opened at the real estate tower. Battery E was reported in order at 8:32 p. m. and Battery C at 9:24 p. m.

As maps and water area charts, applicable to our present positions, had been prepared at Fort Hancock and frequently used at drill, our personnel were familiar with our location and those areas. Therefore, as soon as each battery was in order, it would have

been able promptly to identify targets and open fire. Large water area charts hung in the fire control cars, while small ones were in the possession of observing and spotting details.

On the morning of June 2, after 1-pounder sub-caliber practice had been held and as soon as General Gulick and Colonel Fergusson had completed their inspections, the taking up of communications commenced and orders were issued that the radio car, the two battery fire control cars, and the nine cars on the firing spur would be made ready to return to Fort Hancock. The observation towers of Batteries C and E were disassembled and their parts stowed in ammunition cars. As soon as number 1 gun car had been prepared for travel, man power was used to move it southwest until it almost reached the track in use by the Pennsylvania Railroad. The eight adjacent cars were then closed on number 1 gun car, thus freeing the northeast section of the spur so that it could be torn up early the next morning.

As soon as dinner was over, the men were paid and were then permitted, during the afternoon and evening, to be on pass. This, after the hard work of the last few weeks, was much enjoyed.

On June 3 no sooner was breakfast over than the recovery of communications materiel continued and the removal of the firing spur commenced. The armament

train was made up and placed opposite the camp, where the loading of the cars was completed. The train left Wildwood Crest at 10:53 a. m., Camden at 1:30 p. m., Whiting at 3:25 p. m., Red Bank at 5:27 p. m., and arrived at Fort Hancock at 6:58 p. m.

That afternoon the main body, traveling by motor vehicles, returned to its home station. A rear party was left at Wildwood Crest to wind up unfinished business and to place all borrowed property in excellent condition.

The record service target practices of the firing batteries, for which they were classified as excellent, were held on June 11 and were witnessed by Major General Dennis E. Nolan, the Corps Area Commander.

There remains to add that the regiment derived great benefit from the training and hopes that similar maneuvers will be authorized every two years. It was a pleasure again to demonstrate that railway artillery can rapidly reach and make its power felt in a distant theatre of war. It is believed that the success of the exercises and the subsequent firings was due to the interest, enthusiasm, and loyalty of the officers and men and to the hearty cooperation given us by higher authority. We are most grateful to the Navy, the Coast Guard, the railroads, and our civilian friends, who helped us so handsomely, far more than I have been able to indicate in this article.



Listening Devices and Additional Instruments

By Prof. Dr. Christian von Hofe and Dr. Hans Raaber

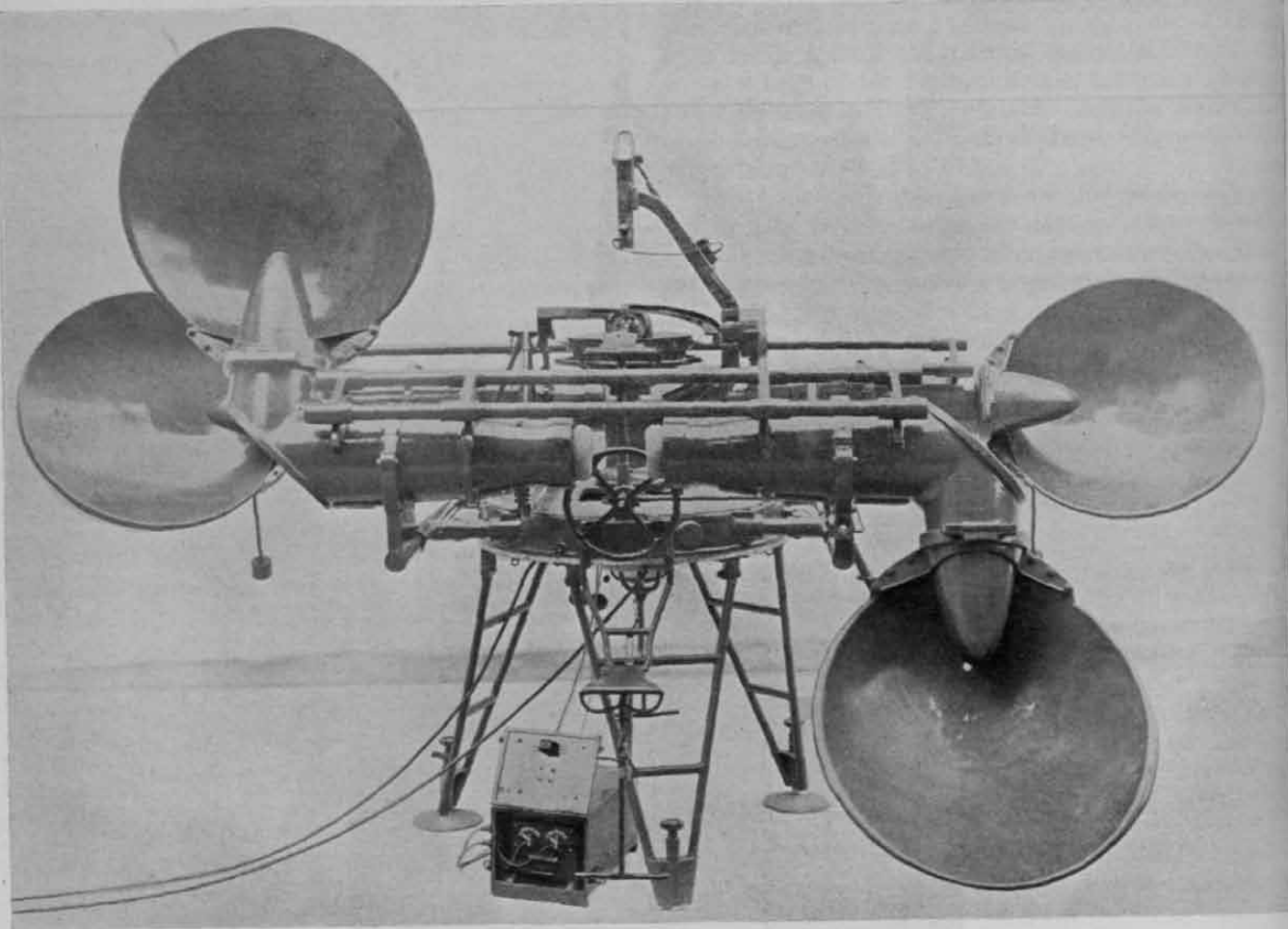
LOOKING back on the history of war weapons it will be seen that each kind of weapon called forth a counter-weapon, each trying to surpass the other. A recent example proving this fact is furnished by the airplane and the listening device used by anti-aircraft artillery in the location of its target.

It is only a few years ago that approaching airplanes were picked up by one or several searchlights searching over the entire night sky. Under this method the spotting of airplanes was only a matter of chance. It is evident that it is more difficult to see an airplane than to hear it. Besides, airplanes will be invisible in the future as they will come only at night or if

12 degrees or more in height. The error in height is greater than that in azimuth because the organs of the human senses have developed themselves according to their need in the fight for life. Up to now the natural enemies of man were to be looked for principally upon the horizontal plane.

The methods undertaken in the development of listening devices were various and depended upon the basic theories applied. But common to all the solutions was the requirement of accuracy in determining the direction of the approaching sound and a listening range as great as possible.

Following the researches of two Austrians (Major Dr. Maurer and Prof. Dr. Haschek) the firm Akciova



The Goerz Sound Locator.

they come during day-time they will profit by the concealment furnished by natural fog or artificial mist. This condition has called for the development of instruments to assist in the operation of searchlights against airplanes by acoustical means or, better still, enable the guns to fire against airplanes using data obtained acoustically without using searchlights at all.

If a person of good hearing is asked to fix a source of sound in space his indications will show an error of about 3 degrees in azimuth and an error of about

spolecnost K. P. Goerz opticky ustav Bratislava (Czechoslovakia) has treated sound waves like beams of light in reflecting them from rotative paraboloids and rotative ellipsoids and assembling them in focal points. Experience showed that sound waves follow sufficiently the law of reflection though doubts arose whether disturbing diffractions due to the unfavorable relation between the parabolic diameter and the length of waves might not be a serious consideration in solving the problem.

If paraboloids and ellipsoids are so combined (see Fig. 1) that the focal point of the paraboloids coincides with one focal point of the ellipsoid, then the "rays" of sound may be caught, conducted and assembled in one point, i.e., the second focal point of the ellipsoid. With this listening device the intensity of the sound is very great in comparison with that caught by the ear alone. All rays of sound which hit the surfaces of the paraboloids are crowded in the focal points that face each other and thence enter the human ears which are kept on the focal points spoken of. The advantage of this combination is that the waves parallel to the axes of the paraboloids are of equal length in the paraboloids and also in the ellipsoids, so that the rays of sound of equal phase will assemble in the second focal point of the ellipsoid, or, in other words, there is no distortion of the sound or tones; the "image" of the sound is perfectly natural so that each type of airplane may be recognized easily by its proper tone. Many practical experiments have given proof of this fact.

A true image of sound still may be obtained with a parabolic diameter of less than 40 cm and with deep tones as they generally come from airplanes (with a frequency of about 70 to 100 a second).

The range of listening is a very extended one (data hereupon will follow) for as already mentioned, the very large pencil of rays hitting the paraboloid will be gathered in the second focal point of the ellipsoid and thus concentrated, will enter the ear of the listening man. As Fig. 1 shows, there can be only two reflections, one in the paraboloid and the second one in the ellipsoid, so that only a little loss of intensity results. On the contrary listening devices with funnels or tube conductors have the disadvantage of having many reflections, thus distorting the sound and causing greater losses of intensity.

The range of listening of all sound locators (listening devices) depends greatly on atmospheric conditions, especially on wind, as well as the intensity of the source of sound. For this reason data regarding the range of listening of different devices cannot be compared without knowing the details of the conditions under which the data have been gathered.

In addition to the above mentioned conditions which influence the listening range, the range also depends on the height the airplane is flying. With smaller heights the intensity of the sound will be reduced by reflection from the ground and other interference, which will be diminished or eliminated with greater heights of flight. Generally it has been found that at night or at daybreak the listening range is superior to that of the daytime.

With favorable weather and with best conditions the Goerz sound locator system with a parabolic diameter of one meter, the sound of heavy airplanes flying at a height of about 2000 m up to a range of 25 km can be heard. At a distance of 15 to 16 km the position of the airplane may be exactly determined and the target may be seen within the central part of the field of view of a telescope directed by the sound locator. It is not possible to work with searchlights at such distances but the searchlight may be

directed on the target by the sound locator so that the approaching airplane will be caught by the first flash of light.

A very essential factor to consider in judging the efficiency of a sound locator is the angle within which the sound rays are caught, i.e., the so-called search-angle. Fig. 1 shows that the paraboloids are cut slantwise. The angle subtended by these two cut-planes is about 140 degrees. This would give a search-angle of 70 degrees to the right and left but the hitting pencil of sound rays should have an appreciable width so that sufficient perceiving energy for the human ear may be obtained. For this reason the search-angle is

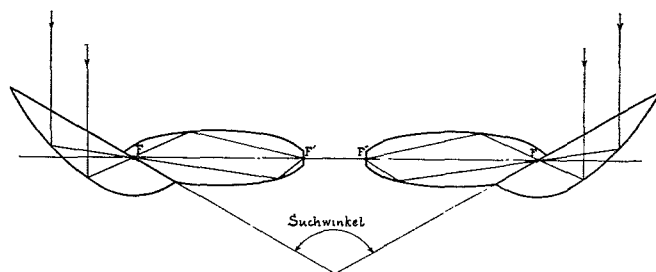


Fig. 1. Schematic Diagram of Goerz Sound Locator.

smaller, between 90 to 100 degrees approximately, but even so it exceeds the search-angle of other apparatus.

The data obtained by the sound locator is used to direct the searchlight towards the airplane. The more exact these data, the easier it will be to hit the airplane at the first flash of light.

The Goerz company claims for its sound locators a precision of $\frac{1}{2}$ degree. It should be understood that this value is given with some precaution. In fact, trained listening men attained with this instrument in actual test an average of about $1/10$ degree of accuracy. Such extreme accuracy may be obtained only by the exact geometric course of the sound rays within the apparatus.

It might be assumed that it would be better to build a sound locator in such a way that it is in resonance with the tune of the airplane to be listened to, as in this case its sensibility for this tone would be the greatest. This assumption would be practical if no other sound existed. But there never is perfect silence in the open field. There are many noises and also the wind with all kinds of frequencies among which at least one will be in resonance with the tone of the sound locator or with its multiples. This fact was true with the earlier Goerz sound-locators. The result was that the tone of the apparatus, which conformed to that of the airplane, was a parasite in listening, so that the listener could not tell whether the sound emanated from the airplane or the sound locator.

Goerz eliminated this proper tone of the apparatus by slitting the ellipsoids. A simple trial made with two cylindrical tubes, one of which has two slits as shown in Fig. 2 whilst the other has no slits at all, will prove that the efforts made along these lines were fully crowned with success. It has been found that the tube without any slits always had its proper tone whilst the slitted tube had none. By slitting the ellip-

soids in this way the listening range of the sound locator was increased about 30 per cent and the selectivity of the apparatus so improved that two sources of sound of almost equal intensity but of different tones could be distinguished as long as the angle subtended by these sources of sound was not smaller than 2 degrees. Their position in space also could be determined as long as this angle was not less than 3 degrees.

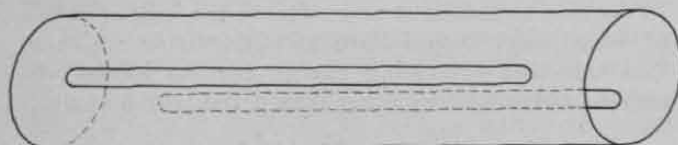


Fig. 2. Tube Free of Its Pure Tone.

This ability of the Goerz Sound Locator is due to its freedom from all distortion and the great accuracy resulting from it. If resonance should be desired in the apparatus this may be attained without difficulty by omitting the slits in the ellipsoids and choosing their dimensions accordingly.

The sound locator indicates the present direction of the arriving rays of sound, i. e., the so-called acoustical direction of the sound. But this acoustical direction differs widely from the present position of the airplane because during the time necessary for the sound to travel from the airplane to the sound locator, the airplane has continued its flight as shown in Fig. 3. If the sound has traveled a distance of 4000 m. from A to RH within 12 seconds (sound-speed of 333 1/3 m.) the airplane flying with a speed of 180 km has traveled in the same interval of time a distance of 600 m. and arrived at B. At the sound locator this difference between optical and acoustical direction of

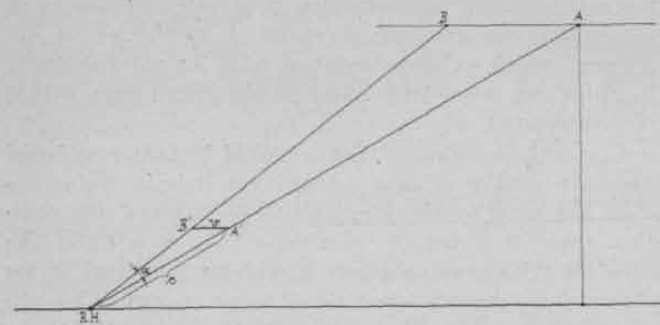


Fig. 3. Diagram Showing Sound Lag.

the airplane is represented by the angle of error: $\alpha = \angle A \overline{RH} B$. If the waves are divided by the time necessary for the sound to come from A to RH (12 seconds) the smaller triangle $A' \overline{RH} B'$ is obtained, where $A' \overline{RH}$ corresponds to the speed of sound c and $A' B'$ to the speed of the airplane v .

The apparatus represented in Fig. 4 mechanically represents this small triangle and serves to determine the angle of error, α , and to eliminate it automatically. The constant speed of sound, c , is represented by the arm, C. The speed, v , of the airplane estimated from the type of airplane, which, owing to the pure sound-image received by the sound locator may be determined very well, will be set on the arm V. The direction of flight indicated by the sound locator's drawing

the wave of sound within the great hemisphere will be considered by setting the arm V in this direction, so that the arm R always will indicate the optical position the airplane is occupying. There is enough time available to draw in the wave of sound, i. e., the course of the airplane, since, due to the extended range of

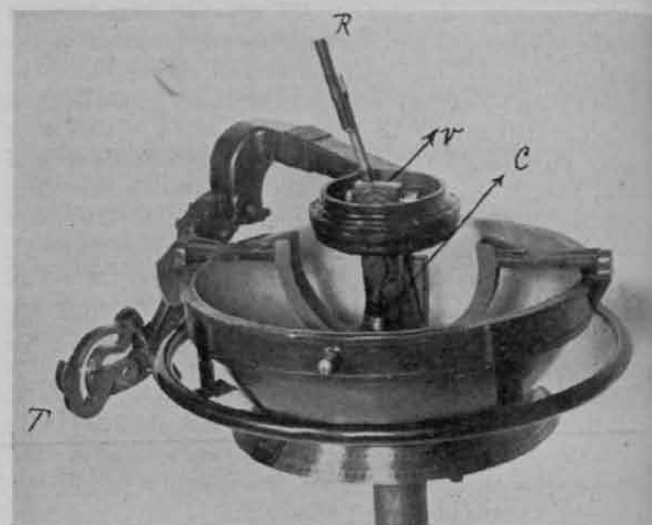


Fig. 4. Instrument for Eliminating Sound Lag Errors.

the Goerz Sound-Locator, the airplane is heard long before the time it can be illuminated by the searchlight.

Fig. 5 graphically represents this error between the optical and the acoustical direction, as determined by the angular height and the speed of the airplane. It can be noticed that this error may be a very great one, which is to be understood as it is due to the fact that the speed of light is infinite in relation to that of the airplane whilst the speed of sound is only 3 to 6 times as great.

Another error which also can be a rather great one though not as great as the aforementioned is due to

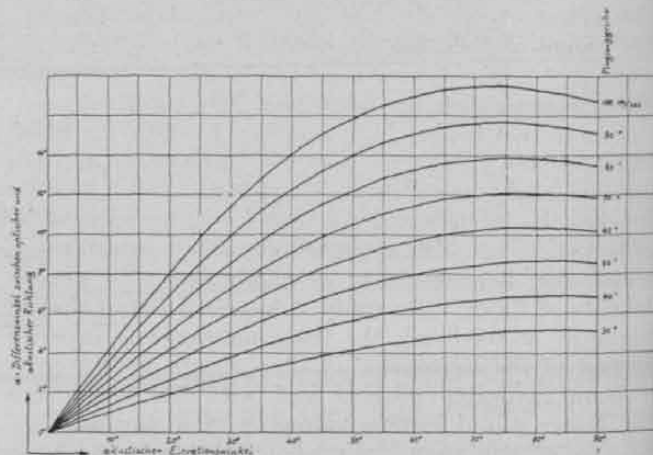


Fig. 5. Diagram showing sound lag errors as a function of height and speed of the plane.

the fact that at different heights temperature of the air varies—the greater the height the less the temperature. The consequence is that rays of sound, similar to the beams of light, do not pass through the atmosphere in a straight line but will make a curve. Lord

Raleigh points to this fact in his book: "Theory of Sound."

As the initial trials made with the new sound locator proved that the acoustical angular height always was smaller than the optical one (sometimes even as much as 6 degrees) Goerz developed an instrument which automatically eliminates this error. Naturally this is possible only for an average value. If no special wishes are expressed Goerz construction is based on a temperature growing colder for 0.5 degrees C. per 100 m. This correction device is shown at T in figures 4 and 6. A computed series of curves inserted in front of the indicating mechanism for the optical direc-

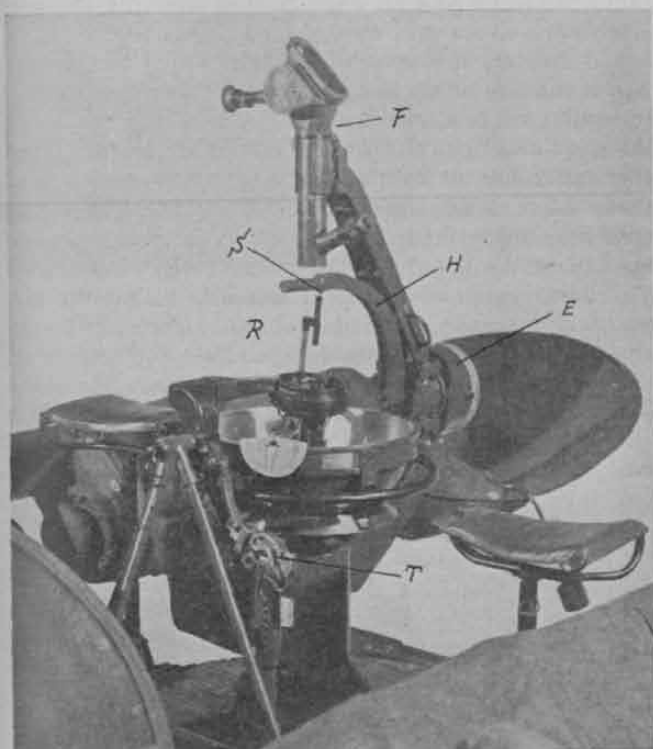


Fig. 6. Correction Devices of the Goerz Sound Locator.

tion corrects this error. As the layers of equal temperature are supposed to be horizontal, this error naturally disappears in the vertical direction of listening and becomes the greatest in the horizontal direction.

Finally there is a third correction to be made on the direction given by the sound locator, which though it is smaller than the two errors mentioned before, would play a sensible part due to the great accuracy of the listening device system. This error is due to the wind. The wind not only influences the range of pensating for this influence is shown in Fig 7. By turning the outside ring R a small rule is turned parallel to the course of the plane and the intensity of wind is set on the scale W. By means of an auxiliary apparatus the angle of drift (delta) is received from the angle of course, the speed of wind and the sound locator but also influences the horizontal and vertical direction indicated by it. The way of com-direction of wind and is set into the apparatus by turning the two handles H. This done the pointer-arm, R, of the system will point to the position in

space which the airplane occupies. As long as the airplane maintains its course the wind-correction automatically will be given exactly.

These three corrections being applied to the components of direction indicated by the sound locator (zenithal and azimuthal direction) the arm R always will indicate exactly the optical position of the airplane sought. Guiding the lever H (Fig. 6) so that

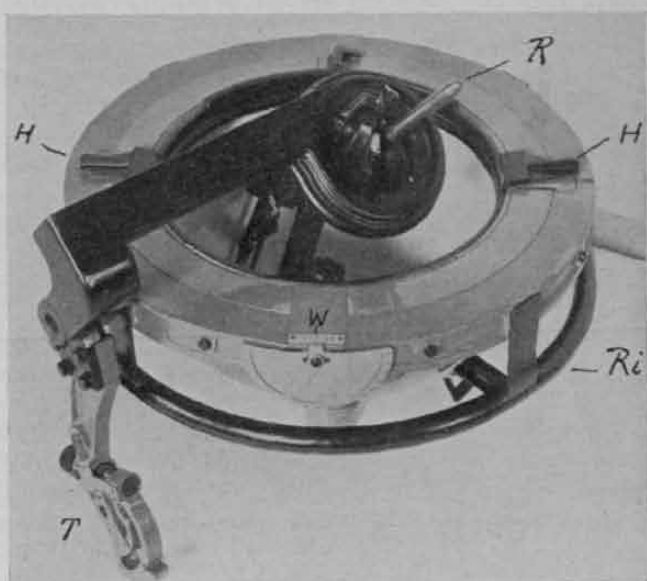


Fig. 7. Wind Corrector.

the point S exactly coincides with the arm R, this direction is transmitted to the telescope F and by means of an electric transmission device E is transmitted to the searchlight. This electric transmission system is represented schematically in Fig. 8.

The zenithal and azimuthal components of direction are transmitted separately to the searchlight. The two transmission devices have contact-plates and the two receivers are provided with the same number of lamps. By means of conducting wires each lamp is connected to the respective contact-plate, whilst the return circuit is completed by one cable common to

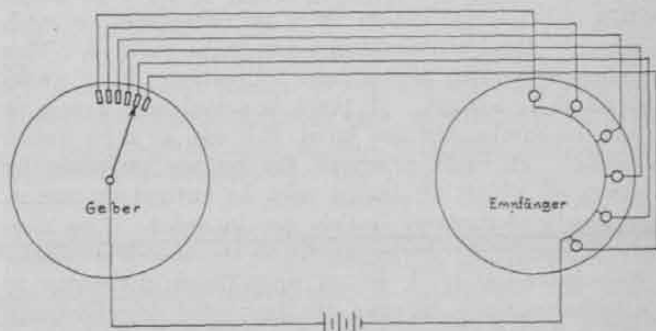


Fig. 8. Schematic Diagram of Electric Remote Control

all. If the circle of 360 degrees is divided into 1000 parts, there would have to be 1000 contact plates, 1000 lamps and 1001 conducting cables. We succeeded in reducing these numbers so that there are not 10^3 but 10 times 3 contact-plates and lamps and accordingly only 31 conductors. Conforming to the decimal system these conductors are subdivided into three cir-

cles—one indicates the hundreds, the second the tenths and the third the units. According to the position of the transmitter, only one lamp will burn in each of the three circles. Corresponding to the three lamp circles each receiver has three concentric pointers. These pointers are connected with the control mechanism of the searchlight, so that the latter will be directed exactly towards the airplane when the pointers of both the receivers are set in such a way that

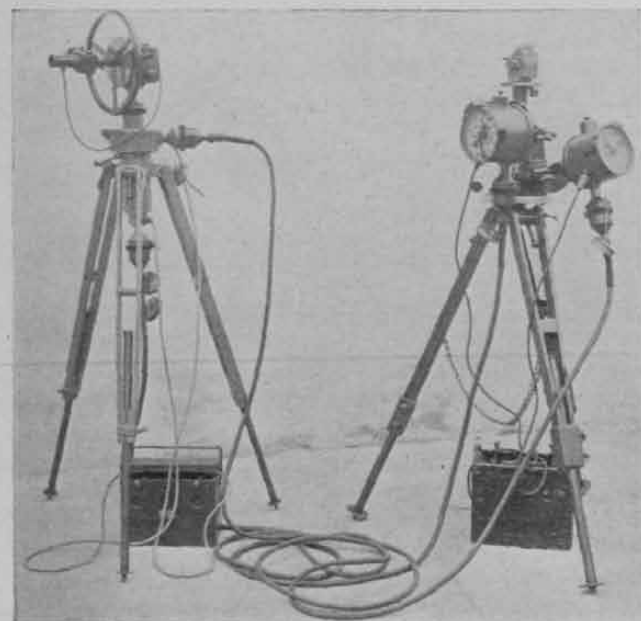


Fig. 9. Electric Remote Control Instrument. The telescope at the left directs the searchlight at a distance.

the lamps burning in the different circles are covered. Thus one thousand positions of the circle circumference can be represented with an accuracy of $1/3$ degree. The unit circle being arranged so that both of two neighbour-lamps will burn simultaneously in a middle-position, the circle may be subdivided into 2000 graduations with an accuracy of $1/6$ degree.

The electric transmission system is so simple in its operation that even an illiterate is able to operate it after a little instruction since no data need be read, but only the burning lamps are to be covered. This system never can give a false indication. If it works at all it is correct. If there is something wrong so that the lamps will not burn, this can be seen immediately. There is a switch for testing purposes by means of which all lamps may be turned on simultaneously to discover if they are in order. This electric transmission device works on the so-called follow-the-pointer-system, i. e., an operator is necessary to keep coincidence between the indicated direction and the transmitted one. The system is operated by direct current of 12 volts and requires a very small source of current.

Fig. 9 shows this electric transmission device with two telescopes. The left side telescope with the two transmitters follows the airplane. By operating the two handles at the right side telescope on the transmitter, the lamps may be covered by their respective pointers or the pointer of the unit circle may be placed

in the middle of two lamps burning simultaneously. Then the telescope will be trained on the airplane. In the daytime the telescope may replace the searchlight and used for drill and control purposes. For this purpose it is provided with two concentric circles within its field of view, dividing it into three zones. The inner circle has a diameter of 2 degrees and corresponds to the cone of light of the searchlight. If the airplane is to be seen within this inner circle then the cone of light of the searchlight would hit it.

As the outcome of experiments along these lines the Goerz Company developed the Commander-Apparatus. This instrument (Fig. 10) consists of a zenith panoramic telescope and an angular telescope. It has two electric receivers and two electric transmitters. The sound locator, the searchlight and the Commander-Apparatus are set up at the vertices of an approximately equilateral triangle of about 100 m. Two cables for the angular height and for the lateral angles lead from the sound locator to the Commander-Apparatus and from there to the searchlight. When the searchlight goes into action the telescope already is trained on the airplane illuminated by the rays of the searchlight. The light commander himself can now follow the airplane and transmit the data to the searchlight. In this case the sound locator becomes free for new work.

Several armies use the following method: The main searchlight electrically directed by the sound locator



Fig. 10. The Command Instrument.

had adjoined three or more other searchlights connected electrically with a searchlight-direction-indicator. (Fig. 9 at left side.) The airplane having once been picked up by the main searchlight, which is directed by the sound locator, the searchlight-direction-indicator continues to follow the airplane by its searchlight and the main searchlight becomes free for other work.

The 103d Trench Mortar Battery in the Argonne

Extracts from the War Diary of 1st Lt. F. C. Tenney (now Lt. Col., 955th C. A., AA).



Lt. Col. F. C. Tenney,
955th C.A. (AA)

Les Islettes,
Saturday, Sept. 21.

The Battery moved last night from St. Meneshould to Les Islettes, going into billets about a mile and a half south of the village.

We understand that for the present we are to be in echelon and in a few days will move into position in the Argonne Forest in a quiet sector as this division, the 28th, has been in

the thick of the fighting for some time.

The other officers in the battery are Lieutenant McAdoo, who came over with me and lived in the same hut with me at school until the middle of April. The others attended the course at the school. They are Captain Knowles, Second Lieutenant Cartier and Second Lieutenant Spillan, all from Philadelphia. I am the only first lieutenant in the battery.

Although we are really very close to the lines, it seems very quiet here. We only hear occasional shelling and once in a while see an airplane chase.

Sunday, September 22.

Today the battery left its position in echelon and moved up to the lines. Captain Knowles, Lieutenants Cartier and Spillan went forward to make a reconnaissance of the positions which are old French positions situated in the Forest at a point where No Man's Land cuts through. The positions are beyond the French barbed wire barriers.

After the positions were assigned to us Lieutenant Cartier took a squad up at night to cut enough of the wire so as to get into the positions. This squad took pup tents with them and spent the night very uncomfortably in the pup tents as it was very rainy.

The work assigned to me at present is to take charge of hauling ammunition. The battery is equipped with Nash quad trucks. The tables of organization call for twelve trucks but we have only eight. Also have a one ton Dodge truck in place of a Dodge five-passenger car that officers are supposed to use. The Nash quad is a good truck for hauling but is very uncomfortable in this weather as there is no overhead cover even over the driver's seat, and the weather is bad, a drizzling rain each day making the roads very slippery.

Wednesday, September 25.

For the past three days I have been up at daylight

hauling ammunition from daylight to midnight.

The ammunition dump is located near Autrecourt, south of Claremont, about twenty miles from our positions in the Forest. Each day we have taken six trucks to the dump, loaded them with our bombs weighing fifty pounds a piece, carrying eighty-five bombs to a truck, and then proceeding to a point as near as possible to our gun positions for unloading.

While I have been busy getting ammunition up with my ammunition detail the balance of the battery under command of Captain Knowles has installed our twelve mortars in very good positions formerly used by the French. These positions are on the side of a hill away from the enemy. A path runs along the slope of the hill about half way from the base to the top. Below us there is a little gully, densely wooded, in which are some dugouts and shelters built by the French the past three years. The top of the hill above us is densely wooded and will require the cutting of some trees to give us a field of fire. We have not been allowed to reconnoiter the top of the hill for every effort is being made to keep the Germans in ignorance of the movement of our troops. The German lines lie nine hundred yards beyond us.

The officers and men are quartered about seventy-five yards from our positions on the lefthand side of the road in shelters built by the French. These shelters are cut into the side of the hill, somewhat like dugouts but are much better in that they have windows and doors leading right into the little rooms, giving better ventilation, and are not as damp as dugouts would be. All of them have concrete floors. The one used by the officers has a fire place, which won't work, and a little concrete porch in front. Besides our cots we have a small table on which our meals are served.

There is heavy shelling each evening but so far nothing has come near us and only once during our trips with the ammunition has there been any danger from shell fire. Just after leaving Claremont the road is exposed to view by the Germans. Yesterday as we neared this stretch a large shell hit in the center of the road directly in front of us. I stopped the truck for a moment to see what direction the shells were to take and finding that the next three went over the road, ordered the trucks to proceed at about a hundred yards apart, full speed. We got through the open stretch without having any shells fall within two hundred yards of us.

Our greatest difficulty has been the congestion on the roads. I never conceived of such movement of troops. The congestion is particularly bad as there is

only one main road leading up into the Forest and more artillery than I realized existed has been moving up the road into positions back of us, all sizes from French 75's up to large 12-inch guns drawn by tractors. We have no difficulty with trucks driven by Americans, but there are also French batteries going



1st Battalion Trench Mortar Artillery leaving the Trench Mortar School, Fort De La Bonnell for the front.

into position and the French drivers want to hog the road. This necessitates very slow movement, delaying us badly, and often forcing some of our trucks into the ditch.

We finally completed hauling forty-five truck loads, or twenty-eight hundred bombs, but did not get all of our powder charges and fuses forward. They were coming on the last trucks and as we came up the Forest road this afternoon we received orders from headquarters that no more trucks were to proceed to the front until after dark. I had to turn the trucks back to wait at Les Islettes until dark before coming up.

I went forward and reported to Captain Knowles and found that they were in a great state of excitement for although we did not know definitely, we understood that the opening of the party was to start tonight. We had received word that the battery which was to come in on our left would not arrive and we would have to move four guns which were in beautiful positions at the right of our sector to the left to cover part of the target that the missing battery would have taken care of. Captain Knowles had secured some Engineers to help in moving the guns but we did not get all of our bombs down from our own little dump beside the road to the gun positions and we did not have enough men of our own to move them as they can only carry one bomb at a time. I felt that we could secure help from the Infantry so took our truck and went back to regimental headquarters of the 111th Infantry where I found a very accommodating colonel who promised me a hundred and fifty men. The Infantry were about five miles back of us in the Forest, living in their pup tents under the trees waiting for the word "Go." A second lieutenant was assigned to me with one hundred and fifty men. I started them

up to the road toward our positions and then went up to help in getting the bombs to the guns.

Our guns were divided into three platoons, four guns to each platoon, with Lieutenants Cartier, McAdoo and Spillan each in charge of one of the platoons.

After getting the ammunition up I was to have charge of the Battery C detail, consisting of telephonists, runners, observers, medical men and plotters, and direct supervision with Captain Knowles of all of the work.

The infantrymen got up to us at about 5 o'clock and worked from then until dark, getting bombs down from our little dump along side of the road to the little dugouts adjoining each gun position. The target which had previously been assigned to us was the front line German trench, known as the Austerlicht, and the German wire in front of the trench. I had never conceived of such trap wire as we could see from our positions. The Germans had had three years to prepare it and undoubtedly had all types of barrier strung in front of their positions.

We have just received word that the zero hour will be 11:30 tonight. We are to start firing at H plus 3, which will be 2:30 tomorrow morning. Directly above our dugouts is a French battery of 6-inch rifles. The French are busy cutting down the trees in front of their guns. The fire from these guns will sweep across the road which we have to cross to get to our positions so we will have to have men at our guns by 11:30 tonight before the fire for demolition commences. We have our guns all moved and have cut a number of large trees on the top of the knoll in order to give a good field of fire for the four guns that we moved from the right to the left. These guns are not in good positions as they are not dug-in and we did not have time to prepare them.

We simply put them on the side of the hill and have built small sandbag walls about them for some protection for our men. It was unfortunate that we had to make this move for in our original positions each gun was in a good dug-in position, well protected from anything except a direct hit.

I have connected telephones from each platoon to our P.C., which is located about the center of our positions in a fairly good little dugout.

Thursday, September 26.

Am sitting on my cot, my diary on my knee, my back against the end of a dugout, or rather a shelter, with the light of a candle over my shoulder. The shelter, as explained already, is built into the side of the hill with a good overhead cover and easy of access.

At 11 o'clock last night we took all of our available men, with exception of the cooks, and kitchen police, to our positions. It was very cloudy early in the evening but shortly after 11 o'clock the moon came out, a beautiful clear night with hardly a sound of any sort in the Forest, an occasional shell dropping somewhere in the German lines, or in the lines back of us.

At 11:30, sharp, all hell broke loose. I had never

conceived of such a noise. It was one that is absolutely indescribable. As our positions were at the very front, the fire was coming from the rear, shells all passing overhead. Each shell has a distinguishing whizz of its own, but there were so many guns firing that it was one continuous swish and screech of shells, so intense that it was impossible to tell whether they were coming from our lines or from the Germans. Within a very few minutes the gully below us was so filled with smoke from the guns that it was impossible to see five feet in front of us. A few minutes after the artillery fire started we distinguished the sound of gas shells coming toward us, a gas shell having no rotating band or tail, tumbles in the air like a foot ball and makes a very distinctive sound. When the shell bursts it sounds like a jug of molasses being dropped and broken.

We kept our men under cover in the dugouts and although there was good overhead cover, it was very nervous waiting for by that time the Germans had opened up and were shelling the woods back of us, some shells apparently dropping pretty close and making an awful crash. I had misjudged the weather and had come without an overcoat. Whether it was the chill of the air or the sound of the shells, I was very soon shivering like a leaf and I believe those three hours were the longest three hours I have ever put in. Every few minutes someone would ask "What time is it?" and we would be surprised to find how slowly the time was passing for we could not start our part of the party until 2:30 a.m.

Probably the sight of the bursting shells on the German line was beautiful but none of us showed any desire to go to the top of the hill to watch it.

In front of us were about twenty men in three little outposts. These outposts had until that evening been taken care of by French but last night the French were relieved by our own troops. The Captain stopped at our P.C. on the way out to show us where his men would be to avoid any possibility of our hitting them when we opened up with our trench mortars.

Lieutenant Spillan's platoon had been chosen as the platoon to fire the first bomb as Sergeant Shannon, who was sergeant of the platoon, was considered the best sergeant in the battery and had done the hardest work in moving the four guns from the right to the left.

Promptly at 2:30 the first of our bombs was dropped into the barrel and our show started. The nervousness left our men immediately. They all took great interest in getting off as many bombs as possible. Captain Knowles and I passing back and forth from one platoon to another, watching them in their work and seeing that everything was moving in good shape. We started firing rapidly but soon had to reduce the speed as the barrels became very hot.

Shortly before 3 o'clock, on the completion of a round, I had stepped into the dugout, which was illuminated by candles. While there, there was an awful detonation, apparently very close. As I remember it now it was simply one heavy rumble, the concussion of which blew out all of the candles in the dugout. A man in another part of the dugout called out "What

was that?" I answered, "Simply a shell, Light your candles." As I spoke Lieutenant Spillan stepped in with a gas mask on. As he took his mask off I noticed beads of perspiration were standing out on his forehead and he was very white. For a moment he could not speak and then he said, "My platoon has been wiped out." I told the operator to immediately get in touch with headquarters and have an ambulance sent forward.

We took all of the men that were not working and started out to see what damage had been done. Lieutenant Spillan's platoon was just around the corner from our dugout. As I turned the corner a man walked forward, his blouse red with blood, so saturated from his neck to his hips that it looked as though the blouse had been dipped in blood. I helped him into a dugout and with the help of another man took off his blouse and undershirt, which was also soaked. Down his back were two lines, about every three inches apart a large welt the size of a walnut, each one bleeding profusely. We wiped the blood off and saw on each welt a piece of black steel. The splinters held back the flow of blood, which stopped almost immedi-



Six-Inch Newton Trench Mortar Showing Gas Ejector

ately. We bandaged him and laid him face down on the floor with a blanket over him.

By this time another man had been brought in with a bad gash in the thigh. The dugout was too small to accommodate any more men so we took our relief crew out and gathered up twelve other men, all very badly

injured, and took them to a dugout at the foot of the hill.

All that was left of one gun was the underplatform, standing upright in a shell crater. Another shell crater adjoined this one, indicating that two large sized shells had hit simultaneously, one a direct hit on the gun.

Men were lying all about. We started to pass by one man, who was apparently dead, having no heart action that we could feel. As we did so he moved his hand. It was found that he had a large piece of shell through one lung. He died within a half an hour. Another one had his intestines exposed. He also died shortly afterwards. Others had minor injuries, broken arms or legs. One had his cheek and eye torn out and one ear torn off and one arm broken.

We patched these men up as well as possible and tried to communicate with brigade headquarters but found that our entire telephone system had been torn up so sent runners back down the road to the nearest



Setting Elevation on the 240 mm. Trench Mortar

dressing station to secure litters and an ambulance if possible, as we did not have even a medical sergeant in the battery and no litters.

We immediately resumed fire on all the other guns and waited for the return of the runners, who shortly came back reporting that the road was lined with artillery and it was impossible to get an ambulance forward, so we could not move our men until about 6 o'clock in the morning.

It was so dark that we did not know at that time how many men had been killed but we felt sure we had gathered up all of those who were wounded.

Lieutenant Spillan had a very marvellous escape. He was in the center of his platoon, was knocked down and when he got up he was the only man standing. There was a dead man on either side of him and one directly behind him. Before coming into our P.C. he went to his own telephone and found the telephone operator dead. There were thirty men in the platoon originally. Eight were killed outright, two died within half an hour, fourteen were seriously wounded and the others suffered more or less from shellshock, while Lieutenant Spillan did not have a scratch or even a

tear in his trench coat, which he was wearing at the time, although he was very badly shaken up and unable to do any more work that night. Among those killed was Sergeant Shannon, who had done such fine work the day before.

Lieutenant Cartier was able to complete the firing of the ammunition assigned to his platoon. About 5 o'clock he moved his men over to the abandoned position, moving the bodies of two dead men from one gun, firing the remaining two guns until 5:30 when our time was up.

Promptly at 5:30 the Infantry started to pass us. They all seemed very cheerful and wanted to know whether we had done our work well and whether the path was open for them in front. They filed by out of sight to go over the top into German territory that had not been penetrated for over three years. As they passed us I realized what it meant to be a doughboy. We had worked hard for six days, had been up all night firing but now our task was done and our men could go back to sleep while the Infantry had to start, not knowing how far they would go or what resistance they would meet, carrying their packs and their rations on their backs.

We held our men in the dugouts until 6 o'clock, fearing that there might be retaliation fire and not wishing to expose them needlessly to further danger. As the Infantry went by I stopped one of their medical detachments, taking their litters from them and started evacuation of our men. Shortly afterwards an ambulance got up the road and we got the rest of them moved, leaving those that were killed where they lay near the positions.

Just back of the gun that was hit there was a piece of barbed wire. Suspended on the wire was what I thought was a fence post but it turned out to be the torso of a man. His arms and legs were gone and his clothing blown off his body, so well camouflaged that it looked like a fence post. Another lay near the gun with his feet drawn up, his eyes open but his face showing the horror of the moment before death took him.

About fifteen feet from the shell hole was a large tree, on the top of which a steel helmet was suspended from the top branches and directly under it were some bandages from a first aid pack, which are carried in a small web packet on a belt wrapped in paper in a tin box. The helmet and the bandages had been blown to the top of the tree by the force of the explosion.

We found a part of the barrel of one gun blown outward, indicating that the shell that hit had caused a premature explosion of one of our own shells that the gunner had just dropped into the barrel and about three or four of our bombs which were laying near the gun had also been exploded, adding to the force of the explosion and accounting for the serious casualties that resulted.

After giving our men hot coffee and sandwiches we told them to sleep until noon. We then sent out a burial party and with the aid of a K.C. Secretary, dug one grave beside the road and laid the ten men, or the parts of the men, side by side wrapped in blankets.

Our bugler had been among those killed so we requisitioned a negro bugler from part of the 92nd Division, which was going forward at that time. After the K.C. Secretary had read the burial service the negro blew taps and we filled up the grave, arranging later to make some crosses to place at the head of the grave on which we would nail an identification tag. The records of each man were placed in a bottle, neck down, on the top of the grave.

After a short rest Lieutenant Cartier and I went across No Man's Land to see the effect of our fire. The wire had been cut in fine shape so that the Infantry could get through and I heard at that time that they had advanced about eight miles through the forest on the other side of No Man's Land.

The first line trench had been completely demolished. It would have been absolutely impossible for anyone to have lived in it. German prisoners by this time had been sent back and on questioning them they said they had never experienced or realized such intensive artillery fire, and that only those who had been given the order to withdraw had lived through it.

This afternoon we packed up our guns, cleaned up the positions and awaited further orders.

Friday, September 27.

The artillery barrage throughout the night was very intensive, indicating heavy resistance on our left. Two 6-inch rifles manned by the French, which are placed on a knoll just above our dugouts, kept up their fire throughout the night, making it impossible to get much rest. The concussion from these guns was so intense that it blew the paper out of our windows. We have received only meager reports and rumors as to how far our line has progressed. We understand that our infantry were able to cover eight miles while the 77th Division on our left has been held up. The barrage is more intense on the left and apparently closer to us. Possibly the Boche are making a stand in that sector. If that is the case our division will carry out a circling movement.

We were able to get the Paris edition of the New York Herald, which gives us some idea of how extensive the drive was last night, apparently covering the entire line with the Americans in the most important part, the Argonne forest.

We all have a feeling that the 28th Division will be withdrawn for a rest as soon as the present new line is established for they have been in the line constantly since Chateau Thierry and have earned and deserve a rest. If that is the case we may not get into another attack for some time and we are all very glad to have been able to hand Fritz his little package of American esteem at this time.

The infantry division Pioneers have been going past all day, together with the Engineers, working as hard as possible to fix up the road which originally ran through No Man's Land after passing our present positions. There are only two roads going up into the Forest and as it is necessary to have heavy concentration over those two roads, repair work must be done before we can keep the advance up at the rate it started last night.

Saturday, September 28.

Nothing new today. The barrage on our left is still very intensive and does not seem to have progressed. We cannot get any information as to what is holding up the 77th Division, nor have we any news from our own infantry.

The Engineers have been able to get the road in fair shape, ambulances have been coming back all day carrying the wounded, indicating that the casualties have been very heavy, but the men who are only slightly wounded and can ride on the front seat or the back of the ambulances are all smiling. Otherwise, we only see their feet protruding from the end of the ambulance, six to an ambulance.

We are getting restless and want to move up where there is something going on.

Sunday, September 29.

Late last night we received orders to move our echelon to Varennes. We made a start at daybreak this morning, loading the trucks and starting them up the road north of us through the Forest. After an early breakfast we lined the battery up, marching them to the grave of our men killed, for a final salute. Facing the grave and standing at attention we presented arms, saluting those that we must leave behind, then started up across No Man's Land and into the Forest beyond.

It was a beautiful morning for a march for the sun was shining and there was just enough snap in the air to make walking pleasant. The road wound through a dense forest of stately trees and thick underbrush. The trees were scarred but not stripped naked or broken as in most places at the front. This underbrush had been a hard barrier for our doughboys to go through but they made it and by now had advanced so far that there was no immediate evidence of war. Of course, there were signs of war present and past on all sides. Along the road were many German graves, very well taken care of and plainly marked, some of them even with stone crosses.

Some negro troops were on the road with us throughout the day. At one point along the road we stopped to rest and a battalion of negroes passed us. It was the first time that they had gone into the lines and they had not learned to travel light. They were carrying extra rations with them, all of them with at least one, and sometimes three, loaves of bread tied on with shoe strings, a hole cut through the center of the loaf, the shoe string run through and tied on to their shoulders or belts. All of them were carrying extra cans of corned willey or gold fish. One strapping negro was leading a scrawny little white puppy by a string. One of our men called out to him and asked him what he was going to do with the dog. With a broad smile he said, pointing to the five pound can of corned willey under his arm,

"That dog don't know what danger he is in when the corn willey runs out."

They were all laughing and joking and seemed to be a merry crowd but even so, they showed nervousness. Our top sergeant in cleaning his pistol, while standing along the road, accidentally discharged it.

The negroes nearby seemed to jump a foot or two, roll the whites of their eyes and asked what was the idea of trying to scare them that way.

We got into Varennes by noon, found a town built mostly on the top of the hill, the main street winding up the hill on one side and running down on the other. The buildings were shelled to pieces, only parts of walls standing, but in a great many cases the basements were liveable for the Germans have occupied Varennes for four years.

Brigade headquarters are established in a vaulted wine cellar, which had previously been used by the Germans, and is equipped with electric lights and a

large German telephone switchboard, the wires of which were converted to our use. At one end of the cellar is a large fire place with plenty of fuel. A roaring fire was kept in it to take the chill from the cellar walls.

Captain Knowles and I reported to the brigade commander for further instructions. The rooms were littered with cots, the staff officers asleep, exhausted after four days of effort. General Price, however, as always, seemed to be wide awake and keen. We were told to pick our own billets in, or in the immediate vicinity of, Varennes and await further orders.

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The Relation of Harbor Defenses to Naval and Military Strategy

By Captain Bryan L. Milburn, Coast Artillery Corps

THE United States occupies a peculiar geographical position. Practically surrounded on three sides by water and with overseas possessions almost completely surrounded by water our problem of national defense is largely a problem of coast defense. With few exceptions troops cannot penetrate our frontiers unless they are transported or conducted by a hostile navy. The enemy fleet, then, constitutes initially our most important threat. The principal function of our Navy in time of war is to meet and defeat, or contain, that fleet. To accomplish such a mission it must concentrate its forces, move to sea, and gain strategic freedom. "The sphere of the fleet," said Mahan, "is on the open sea; its objective, the enemy fleet and shipping wherever it may be found." Its coastal duties are limited to the protective use of mines, bombs and nets and to the employment of light craft for reconnaissance and patrol work. In the latter respect they render invaluable support to harbor defenses. The fleet proper, however, must gain and maintain the initiative to be successful. There are very few cases on record of naval victories being won at home. The idea that the fleet can best contend with enemy naval forces by organizing floating defenses at strategic points on our coasts was early abandoned as illogical and a waste of power and resources. To give each such naval detachment a strength sufficient to meet a strong naval force is obviously impossible. Further, it is obvious that to parcel the fleet out and dissipate its strength into small detachments, that can be defeated in detail by stronger forces, invites disaster. This was demonstrated in the Russo-Japanese War.

Guns are mounted on ships to give them strategic mobility. No other purpose is served. To immobilize guns afloat is comparable to a field commander placing mounted cavalry in front line trenches. From every standpoint guns emplaced ashore are better prepared to undertake the defense of specific localities. They have the advantage of a more stable platform, greater security and concealment, better fire control and a more abundant and accessible ammunition supply. Napoleon said that a gun ashore is worth ten at sea. In attacks against seacoast fortifications naval forces have been uniformly unsuccessful and it is now an accepted principle that direct attack of harbor defenses by an enemy fleet is most unlikely.

It is in this sufficiency and efficiency of harbor defenses that we find their principal relationship to naval strategy. By furnishing the best possible defense of our important harbors, they relieve the fleet of responsibility for them and permit it to attain

the strategic freedom essential to accomplish its principal mission of meeting and engaging the enemy fleet. "Our Navy," said Admiral Scofield, "must have strategic freedom and strategic freedom is largely a matter of coastal fortifications at home."

Although strategic freedom is essential to naval success a fleet cannot carry on extensive operations at sea without fortified bases from which to operate and protected lines of communication. Harbor defenses also lend valuable support to the fleet in this respect. The sea power of Great Britain is more than a boast or legend. That she has practically ruled the seven seas, however, and occupies such a commanding position today has not been due to ships alone. She has maintained a strategic distribution of her fortified bases along her lines of communication and trade routes. Note the position of Singapore, commanding the Far East; Gibraltar, Malta and other bases, the routes to the East. Gibraltar, particularly, has been an important factor in many British naval successes, permitting her fleet to be shifted between the Mediterranean and the Atlantic. The Panama Canal occupies a similar position with reference to our Navy. In fact, American naval strategy is based largely on the ability to concentrate our fleet quickly in either the Atlantic or the Pacific, through the Panama Canal. The Canal must be kept available for this purpose. Our strong harbor defenses there help make this strategy possible. The harbor defenses in Hawaii also assist in this mission. They deny the enemy the use of this important base in operating against the Canal and our coastal frontier and afford a fortified base two thousand miles from our coast from which our own fleet can operate against an enemy in the Pacific. "It is rare," says Admiral Belnap, "that so important a factor in the attack or defense of a coast line is concentrated in a single position of such commanding importance. We are not so fortunate in the Far East. With further fortifications of the Philippines now denied by treaty and with bases of other powers occupying commanding positions, our position there is obviously insecure. Our Atlantic coast is likewise exposed. Note the proximity of British bases and the absence of our own. Many feel that the Virgin Islands, acquired in 1917, should be strongly fortified to protect our right coastal flank. Our North Atlantic coast, however, the wedge to the heart of our industrial and commercial life, contains decisive objectives on short lines of approach, and with our fleet defeated or contained, presents strong potentialities for overseas expeditions.

There is always a possibility, of course, that supe-

rior naval forces or a combination of forces will preclude or restrict the strategic freedom of our own fleet. In such an event, our harbor defenses play a particularly important part in defending our most important harbors and in protecting the fleet; gaining time for it, permitting it to organize, debouch, and regain the offensive at the earliest and most favorable opportunity. Helgoland and the harbor defenses of the German coast not only resisted invasion but permitted the weaker German navy to ride safely at anchor, to send out its submarines, and to take the offensive at the most favorable opportunities.

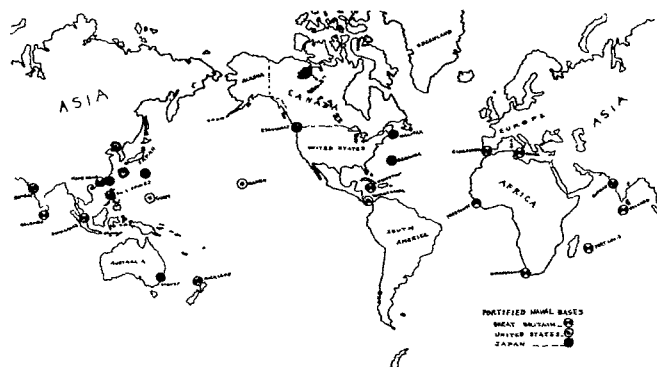
A brief review of the naval strategy in the World War will disclose the influence and relationship of harbor defenses. The paramount task of the British Navy was to meet and defeat the German fleet. To do so it was necessary for it to free itself from the responsibility for the close defense of the English coast. There was strong political pressure, just as there was during the Spanish-American War, to make the navy a floating defense, but sound strategy prevailed and the Grand Fleet concentrated and gained the strategic freedom necessary to gain contact with the German fleet. But that fleet preferred to remain,

our territory and its resources. The doors through which he may enter are distributed along our frontiers. Our Navy, supported by aircraft from land and sea, will endeavor to keep the enemy from our coasts, but in the final analysis our frontiers must be defended. It is the general function of the Army to conduct land operations in defense of United States territory. As such, it is charged with the defense of our frontiers, a line of resistance for which no particular arm, but the Army *as a whole* is responsible.

Our frontiers are divided into sectors and subsectors, each under a commander who has the troops of all arms at his disposal. The status of harbor defenses is in no wise that of a "kingdom within a kingdom." They operate as do other arms, under the sector and subsector commanders. They are merely strong points in a line of resistance and cover strategic localities in that line with a minimum force and with means best adapted for the defense of such localities. It is now an accepted principle of warfare that any line of resistance should be strong in fire power, but held with as few troops as possible, the bulk of the forces being held at strategic points in the rear to meet any contingency that may arise. *Harbor Defenses are a direct application of that principle.* By holding strategic points along our coast lines with a minimum force and with maximum fire power they permit the bulk of our forces, the mobile army, to concentrate, attain strategic freedom, and move to any threatened point on our coastal or land frontier. This is one manner in which harbor defenses bear a direct relationship to military strategy.

In modern warfare it is becoming increasingly essential for an invading army, with its tanks, airplanes, artillery and impedimenta of all kinds, to secure the possession of a good harbor, with anchorage and terminal facilities, to make an invasion effective. A fortified harbor, for our more important harbors are fortified, would best serve the purpose of an invader. But naval and military leaders are now of the opinion that a combined naval and military force cannot afford directly to force a strongly fortified harbor. History indicates that such an operation would not be successful. The invading force must conduct landing operations *outside* the range of harbor defense armament. Harbor defenses in thus forcing the enemy to attempt his landings at places generally less favorable to an effective invasion perform another important mission in support of our mobile forces. They have not only protected strategic points, centers of our commercial and industrial life and potential bases of operations against our own land forces, but have forced him to attempt landings where our mobile forces are best prepared to meet him. Few people realized until the Gallipoli campaign how difficult it is to land troops and equipment on open beaches, or in shallow harbors, without proper facilities. It is one of the most difficult of all military operations.

The Gallipoli campaign was typical of the relation of harbor defenses to military strategy. There the British fleet first attempted to force the Dardanelles but the Turkish forts, antiquated as they were, resisted



at least temporarily, within the bight of Helgoland under protection of its harbor defenses and those of the Kiel Canal. There the British fleet, in spite of its superior strength and strategic freedom, was unwilling to venture. So it did the next best thing. It based on Scapa Flow to prevent the escape of the German fleet through the northern exit of the North Sea. (The Germans retained a small fleet in the Baltic and a concentration of the two fleets through the strongly fortified Kiel Canal was always possible.) This long distance blockade continued until the German fleet ventured out to the indecisive battle of Jutland. The night following the battle it withdrew under cover of darkness to the bight of Helgoland. The strategic freedom of the British fleet had given it the opportunity of meeting and engaging the German fleet but that fleet had wisely taken advantage of Helgoland to retire and debouch at a time most suitable to its purpose. The naval strategy of both fleets showed very plainly the influence and relationship of harbor defenses.

But although navies are essential and naval action often decisive, we cannot escape the fact that operations at sea are important only insofar as they effect events on land. The ultimate object of the enemy is

all attempts. They not only denied the Dardanelles to the British fleet, and thus secured the Turkish line of communications, but by successfully defending that line they forced the enemy to attempt landings on the open beaches where landing operations and advances were extremely difficult. They also afforded the Turkish field army the time, opportunity, and strategic freedom to resist successfully the attempts of the British to secure a foothold.

The World War furnished other examples of the value of harbor defenses in military operations. After the capture of the Belgian coast the German army found its north flank exposed to the sea, a navy held on the defensive unable to render assistance. So there grew up between Nieuport, where the flank rested, and the Dutch frontier one of the most elaborate systems of seacoast fortifications the world has ever known. That they fully served the purpose for which intended has not been questioned.

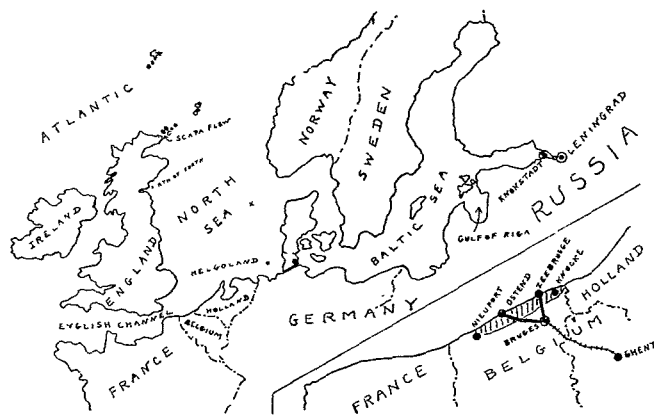
Admiral Bacon writes an interesting account of how the installation of a 12-inch battery at Knocke caused the Allies to abandon a joint operation planned against the Belgian coast near Ostend, fifteen miles away. In this instance, as in many other instances, harbor defenses performed an important mission without becoming actively engaged.

President Wilson pressed Admiral Sims for an answer as to why the Allies did not attempt an invasion of the German coast itself and end the war immediately. Admiral Sims replied that Helgoland and the other German coastal fortifications were too strongly held. The absence of harbor defense action is often an indication of the value of the defenses and is in no wise an indication of their unimportance.

Fort Monroe is a classic example of the value of harbor defenses depending not so much on the battles fought as upon those they are not required to fight. As so well expressed by General Embick in an article in the *COAST ARTILLERY JOURNAL*, here was "a Federal outpost, thrust well forward in the heart of the Confederacy, held by a small force at no time a serious drain on the strength of the Federal armies, which closed to the Confederacy throughout the war the entrance to Hampton Roads and the James River; made it possible for the Federal government to maintain complete control of the invaluable communications of the Chesapeake; afforded an advanced base for joint expeditions against the Carolina coast and for the operations of the Army of the Potomac against the capital of the Confederacy; and yet Monroe was not attacked, the Confederates deeming it too strong. *These momentous results were a consequence of its mere existence.*" It is such instances as this which Admiral Mahan had in mind when he said: "The harbor defenses that stand unafraid before the greatest of our ports at home and abroad earn fully, in the battles they may never fight, the cost of their construction and maintenance."

It is difficult to conceive of a situation in defense of our country in which our harbor defenses would not play an important part. As long as practically our entire frontier is represented by a coast line and

the land frontiers are relatively unimportant, their importance cannot be denied. In the past, as at present, however, attempts have been made to protect, or to suggest the protection, of coastal frontiers without them. The chain of Martello Towers, some of which are still to be seen on the south and east coast of England, relies of the past, is a notable example. The parcelling out of a fleet into floating coastal defenses was advanced and early abandoned for the reasons already stated. Submarine mines have, likewise, been advanced as the solution of our coast defense problem but the use of mines without land batteries to protect them is a poor defense. This was shown at Dalny in the Russo-Japanese War. Next, came the submarine as the sole and best protection of a coastal frontier. But, valuable as they are, submarines can no more be tied down to a locality than can a fleet. The one great advantage that they have over the land gun, mobility—the advantage of operating farther afield—



provides the strongest reason for their not being confined to a particular locality. Further, they must always have a fortified base from which to operate. And now, in recent years, comes the airplane as the sole defender of our coasts. No attempt will here be made to discuss the relative merits of the gun and the plane. There is much to be said for both. The Coast Artilleryman is the first to acknowledge that the airplane has a role, an increasingly important role, in coast defense. That it can and should *replace* our harbor defenses, however, is another matter. The Air Corps' mission, like that of our other mobile forces and our Navy, requires strategic freedom. Harbor defenses, its antiaircraft artillery assisting, aid in furnishing the strategic freedom it requires. In a future war the successful defense of our coastal frontiers will require the closest cooperation, the combined resources, of our harbor defenses, our air forces and our naval forces. Each will rely upon the other two, and their fields may often overlap, but their missions remain distinct.

To summarize, harbor defenses bear an intimate and definite relationship to naval and military strategy. By holding important harbors and bases at home and abroad they permit the fleet to attain the strategic freedom essential to the accomplishment of its principal mission of defeating or containing the enemy fleet. If circumstances preclude the fleet from taking

the initiative initially, they afford it the necessary protection, to allow it to concentrate, organize, and debouch at the most favorable opportunity. Their relationship to military strategy is quite similar. By holding strategically important harbors—strong points in our line of resistance—they force the enemy to seek less favorable points for a successful invasion and afford our mobile forces the time and strategic freedom necessary to resist successfully the operations of the enemy.

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Brig. Gen. T. W. Darrah congratulating Master Sergeant John C. Fern and 1st Sergeant Richard F. O'Donnell at the review held in their honor at Fort Amador, C. Z., on the occasion of their recent retirement. Master Sergeant Fern, was long the first sergeant of the old 73d Company and one of our most efficient and respected soldiers throughout his service. The Association and the Journal congratulate both of them.

The Imponderables in an Estimate of the Situation

As Illustrated by Stonewall Jackson's Valley Campaign

By Colonel Weston Jenkins, 390th Infantry

THE finest mental training for civil as well as military life in the solving of problems by that systematic process of thought taught in our service as the "Estimate of the Situation." No student can repeatedly go through this methodical weighing and comparison of the pertinent factors of a situation without forming habits of mind which will be invaluable to him, regardless of the vocation he pursues. Yet, useful as these exercises are, the most important factors in an Estimate of the Situation are left out of every problem we solve. We take account of relative strengths; the amount of artillery the writer of the problem has assigned to us as against the amount he has given the enemy. We can count noses and we can count tanks. We can measure the miles we have to go and compare it with the distance the enemy has to march,

*"Then take the result, as you readily see,
Add seven and ninety and two,
Subtract seventeen and the answer must be
Exactly and perfectly true."*

But it isn't always exactly and perfectly true. Inferior and poorly equipped armies have repeatedly defeated superior, well equipped forces. The favorite horse has often been the last in the field. There is evidently something else we must take into account; something beside guns and tanks and a count of noses. Obviously, we must weigh carefully the balance of material forces, but unless we use it in conformity with the higher factors, unless we understand the human equation, our superiority of force may prove an illusion.

What factors did Washington utilize at Valley Forge and Joan of Arc at Orleans? What did the Japanese overlook at Shanghai? What unseen forces did Lee and Jackson control, which McClellan and Pope could not grasp? What did Napoleon mean by "In war the moral is to the physical as three is to one"? What are these elusive things that are three times more powerful than guns and numbers and tanks and airplanes?

The Imponderables—the things of the mind and spirit and soul that cannot be weighed or measured or touched, yet have in them the power to move mountains and conquer the world. Stronger than bands of steel, more powerful than T. N. T., yet insubstantial, they exist as latent forces, waiting to be tapped by those who know their existence and understand their use.

Of themselves, the Imponderables can do nothing. What man by taking thought can add a cubit to his stature? Elan, unless properly directed, is apt to lead to foolhardy sacrifice; unreasoning faith only pro-

duces martyrs. But Cromwell took directed faith and elan and forged a thunderbolt. It is when one understands how the Imponderables impinge on the human mind, how they can breed fears, excite enthusiasm, paralyze initiative or reach into unexpected depths of endurance, that they make themselves felt and may be used to exert a physical influence on human works.

It is difficult to put these matters in a lesson to be solved. No teacher can write into a problem the breaking point of a sturdy will. Hopes, aspirations, fears and loftiness of soul have no unit of measure susceptible of exact definition or to comparison by mathematical computation. We must be in the living presence of these things to understand and evaluate them.

Yet they are susceptible to systematic examination and evaluation—not in a problem on paper, perhaps, but in the serious business of war. The great captains have all used them. Joan of Arc had a wonderful grasp of the Imponderables and their use. Here was an unlettered, poor peasant girl, sixteen years old, her life spent in the narrow routine of a medieval village; a shepherdess given to dreams and visions; yet the first army she ever saw, she commanded and led to victory. Her history is so surrounded with myth and legend that it is difficult to extract the real facts, but we know she was no figurehead. She saw clearly the combinations necessary for victory and it was her ideas, translated into action, which led to success. It is possible that the old soldiers who surrounded her were an exceedingly efficient staff but lacked imagination, and that Joan's clear mind and lofty soul understood how the patriotism and religious fervor dormant in the French could be roused into action by a proper use of the Imponderables. It would be of wonderful interest and value if we could piece together Joan of Arc's estimates of the situation and understand how she evaluated the Imponderables. However, history as a rule only tells us of the results of the combinations of the great captains and but little of the process of thought which led up to the result; how much weight they attached to this and why they rejected that.

One of the great masters of the Imponderables was Thomas Johnathon, better known as "Stonewall", Jackson. Fortunately, his campaigns have been studied by careful historians and we can come measurably near judging how he cast his Estimates of the Situation. The most reticent of generals before a battle, he made a practice of afterward enlightening his staff as to why he made the moves which puzzled them so at the time.

There seem to have been but two tangible factors he gave any weight to at all. Numbers opposed to him, he ignored—he had to. Supply and equipment, he perforce had to be content with what he had, which was little. His plans were built around the Imponderables which, with the tangible of mobility, he used to concentrate on the one sensitive spot at the critical time and won victories against overwhelming odds.

Let us turn to the battle of Kernstown.

MAP PROBLEM No. 1

Imponderables in

An Estimate of the Situation

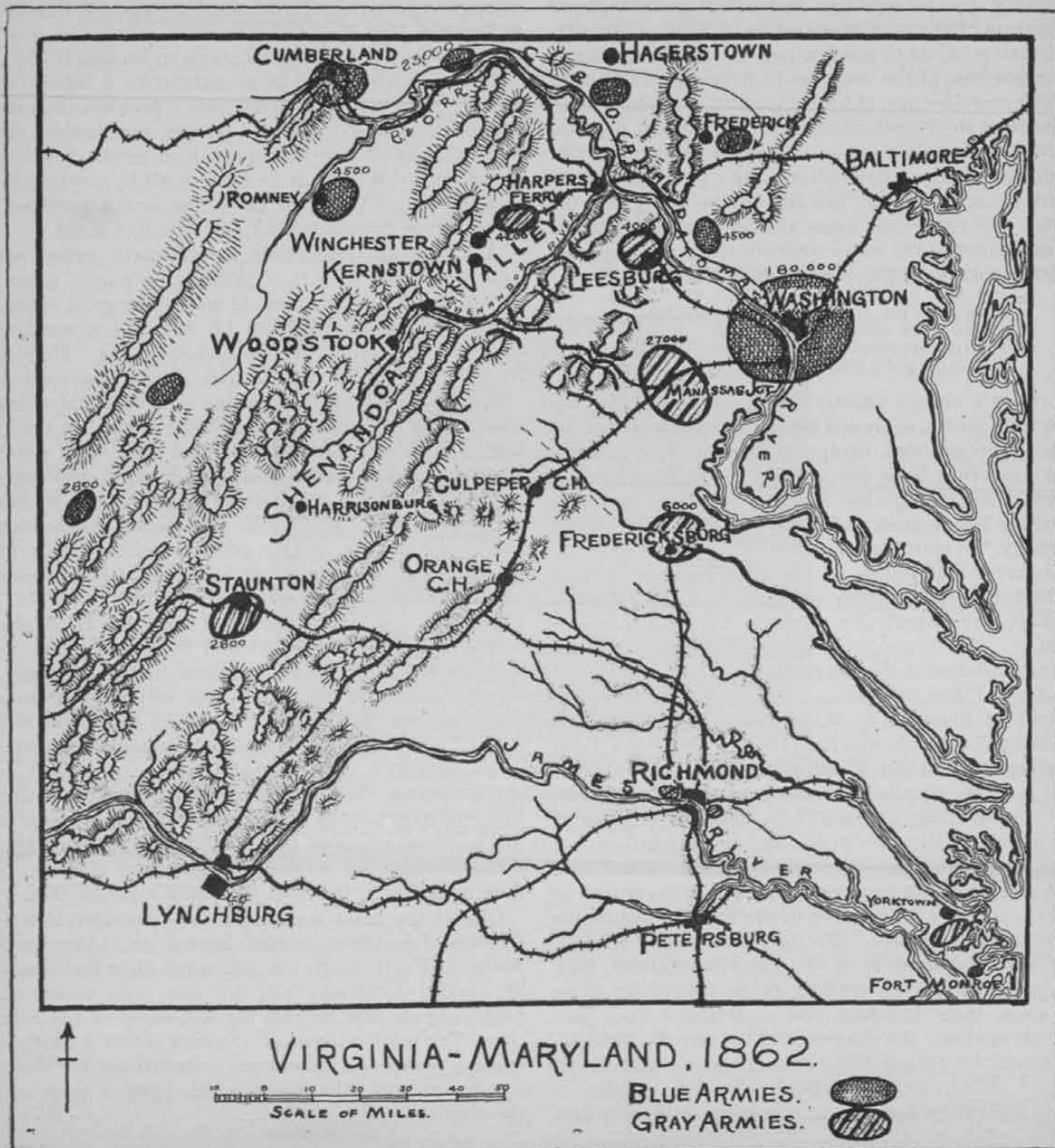
Maps: General Map: Virginia and Maryland 1862.

GENERAL SITUATION: The Potomac River is the boundary between two hostile states. Blue, north, and

Gray, south. Gray, formerly a part of the Blue nation, seceded the previous year, since which time there has been a state of war between them. The Blue capitol is at Washington, the Gray at Richmond.

The main Blue army (180,000) has concentrated in the vicinity of Washington, another army (23,000) covers the Potomac River from Harpers Ferry to Cumberland with Headquarters at Frederick, where there is a reserve of 4500 men. This army has an additional force of 4500 men at Romney. A smaller Blue army occupies western Virginia and threatens Staunton. In addition to these forces, Washington and Fort Monroe have permanent garrisons.

The main Gray army (50,000) covers Manassas Junction. Its right rests on Fredericksburg where there



are 6000 troops, its left on Winchester where there are 4200 of all arms, known as the Army of the Valley. Connecting this latter force with the main body at Manassas Junction there are some 4000 troops at Leesburg. A separate force of 11,000 is at Yorktown facing a threatened invasion from Fort Monroe. Some 2800 men are at Staunton protecting the upper Shenandoah Valley, and Richmond has a small garrison. These are all the Gray troops in the theatre of operations. No assistance can be expected from other theatres.

Blue has been spending the winter equipping and training his armies and is expected to initiate an invasion of Gray territory in the near future. Gray has spent the winter in minor operations, in consolidating his positions and in preparations to meet the expected spring offensive.

Blue resources are ample for any emergency. It holds command of the sea and its armies are fully equipped and supplied. Gray's resources are limited. Its armies are miserably clad and supplied, and poorly equipped.

Blue is well trained and determined with good morale. Gray is well trained and has exceptionally high morale due to previous victories. Gray's cavalry is superior to Blue's but his artillery is inferior.

The climate is mild, although rather rainy in the spring. Main roads are fair except in the immediate vicinity of the armies where movement cuts them up and artillery and transport have difficulty in movement. Side roads are generally bad.

Both Blue and Gray have unflinching determination to prosecute the war to the finish.

SPECIAL SITUATION: The Gray Army of the Valley, three work brigades of infantry (3600 rifles) with six batteries of artillery and one small regiment of cavalry attached, from positions in and about Winchester, has spent the winter covering the Shenandoah Valley and observing the Blue forces along the upper Potomac and in western Virginia. In the latter part of February, Blue forces advanced from Harpers Ferry and threatened Winchester with 23,000 troops. During the period 7-9 March, Gray forces at Manassas Junction and Leesburg retired south of the Rappahannock River. Instructions previously issued to the Commanding General of the Army of the Valley stated this retirement was contemplated and that he was to conform to it, delaying the enemy to his front as long as he could. These instructions were construed by General "Army of the Valley" as not requiring a deeper retirement than the occasion demanded. Accordingly on 11 March he retired forty miles to Woodstock, and Winchester was occupied in force by Blue.

On 17 March the main Blue army started its movement from Washington to Fort Monroe by water, with Richmond as its ultimate objective. On 8 March General "Army of the Valley" requested reinforcements hinting that with them he could seriously disturb Blue plans but his request was refused. Shortly after he received further instructions, the gist of which was as follows:

"You are to employ the invaders of the Valley

without exposing yourself to the danger of defeat, by keeping so near the enemy as to prevent him from making any detachments to reinforce the main Blue army, but not so near that you might be compelled to fight."

After occupying Winchester, the Blue army consolidated its positions and, leaving some 10,000 troops just south of Winchester, started a withdrawal of the remainder.

By 20 March the general Blue plan was divined as a converging movement on Richmond with the main effort moving from Washington by water to some base along the lower Chesapeake Bay, while a strong force moving overland was to cooperate.

On the evening of 21 March, General "Army of the Valley" received reports from his cavalry that the Blue force to his front had been reduced by recent detachments to some 5000 or 6000 troops and was retreating. Wagon trains had been observed moving eastward from Winchester.

Required: General "Army of the Valley's" "Estimate of the Situation" as of 8:00 p. m. 21 March, 1862.

A Solution

General "Army of the Valley's" Estimate of the Situation as of 8:00 p. m., 21 March, 1862.

1. *Mission.*

As stated it reads:

"To employ the invaders of the Valley without exposing yourself to defeat by keeping so near the enemy to prevent him from making any detachments to reinforce the main Blue army, but not so near you might be compelled to fight."

While these instructions embody the letter of his instructions, the Commanding General "Army of the Valley" reads more into them than appears on the surface and seeks the spirit behind them.

Carefully analyzed these instructions convey two separate and distinct thoughts:

- (1) The result to be effected: i. e. to prevent Blue from reinforcing his main effort by detaching troops now facing the Army of the Valley;
- (2) General instructions limiting the manner by which the result is to be effected; i. e. by pressing the enemy closely but not to risk an engagement.

General "Army of the Valley" decided that his real mission lay in the result he was to accomplish, and his instructions as to how he was to effect this result were only binding while effective. If at any time they were not effective and did not accomplish the end, if other means were indicated as necessary, he was willing to run counter to that part of his instructions limiting his actions. The longer he pondered over the problem before him, the broader it seemed, until he felt that any move of his which simply retained the Blue forces now in the vicinity would be inadequate, that the spirit of his mission justified, the more daring strategy of drawing upon his little army, other forces destined for the main Blue effect.

In this he was exhibiting his character as a great general. The ordinary general would have looked mainly to that part of his instructions advising him to keep

in touch with the enemy without bringing on a general engagement. A good general might have seen further and attempted by pressing close to prevent any detachments from being made, but still kept from a general engagement, thus carrying out his instructions to the letter. But, it takes a truly great general to so work himself into the spirit of his instructions that he feels the full strength of all the forces which underly the strategy of a campaign and is able to discard the unessential and concentrate on the essence of the matter. So General "Army of the Valley" construes his real mission as follows:

"To induce Blue to retain in the Valley all troops in the vicinity and draw upon himself all possible forces intended to reinforce the main Blue effort."

How? is a matter for the Estimate to determine.

2. *Opposing Forces.*

(a) *Own Forces.*

Composition and Strength: Three brigades infantry (3600 rifles), six batteries and one regiment cavalry (600 sabres). The infantry and five batteries are concentrated at Woodstock, while the cavalry with one battery is in close touch with the Blue outposts south of Winchester. Physical condition of troops—good; Morale—high; Training—good. They are troops seasoned by several campaigns and elated by previous victories.

Supply is barely sufficient, transportation is crude, clothing, rags; the men look more like scarecrows than soldiers—nothing is bright but their rifles.

Other Gray troops: The nearest are about fifty miles away along the Rapahannock where Gray's main army, some 40,000 men, is poised ready either to face a Blue advance from Washington or to move southeast of Richmond, whichever will be required. No help can be expected from these troops who are facing the main Blue effort. Indeed, instead of expecting assistance, he must render it; any move made by the Army of the Valley must help the main Gray force. The total of all Gray troops in the theatre of operations is somewhat over 80,000 of all arms.

(b) *Enemy Forces.*

Composition and Strength: 180,000 troops have been concentrated in and about Washington, of which an undetermined number have been put enroute for the Yorktown area. 4500 are near Fredericksburg, 23,000 along the upper Potomac of which 9000 are at Winchester and about the same number at Harpers Ferry. 4500 are at Romney and a number of smaller detachments in western Virginia. Including the garrisons of the Washington defenses, Blue has nearly 250,000 men in the theatre of operations. These forces consist of the proper complements of all arms.

Physical condition and training—fine.

Morale—good but not as high as Gray.

Supply and equipment—the best and most complete unlimited resources can furnish.

While a large number of these troops are tied to the defense of localities, such as Washington and the upper Potomac, still an overwhelming number can be concentrated for a mobile offensive operation.

(c) *Relative Combat Strength: General "Army of*

the Valley" estimates that the enemy has 5000 to 6000 men to his immediate front, but 12,000 more are in or near the Valley which, with 4500 near Frederick and 4500 at Romney and some scattered detachments, could be called in and available in three days or so. So, while the force immediately facing him is only ten to fifteen percent stronger than he, nearly 30,000 Blue troops, or seven times his own strength, can be concentrated on him in a few days.

The main armies have not fully developed their lines of action as yet, but the whole Blue force outnumbers Gray three to one and his mobile field army, which will probably consist of from 120,000 to 175,000 troops, will outnumber Gray anywhere between the proportion of three to two up to two to one in the field.

Gray has withdrawn to the line of the Rapahannock with his main army.

Blue troops to General "Army of the Valley's" front are initiating a rearward and easterly movement. It hardly seems within the bounds of possibility that this little army of 4200 men in the Valley can influence vitally the movements of a host sixty times its size. The material factors are preponderantly against General "Army of the Valley," monstrously so. But we have not as yet considered the Imponderables in the case.

These General "Army of the Valley" evaluates as follows:

(1) By virtue of its constitution the Blue command rests eventually in the hands of the President of the country. He operates as a rule through his Secretary of War who gives directions to the high military command. At the present time the command of all Blue armies rests in one general (McClellan) who is in supreme command, but answerable to and removable by the President. General "Army of the Valley" has noted, however, that while the chain of command supposedly runs from the President through the Secretary of War and the supreme military commander to the various armies, there has at times been a tendency for the President and Secretary of War to usurp purely military functions; that sometimes one and sometimes the other would issue orders to army and detachment commanders over the head of the supreme military commander.

Here is the first Imponderable. Divided command and authority.

(2) General "Army of the Valley" has noted in the attitude of the Blue press and people, and also in the Blue administration, a certain lack of confidence in their General of the Armies, although the Blue army itself has implicit confidence in him. Then, too, certain rumors have it that there is a serious difference of opinion between the administration and the General of the Armies as to the plan of operations most desirable.

Here is the second Imponderable: Disunited councils and lack of confidence.

(3) General "Army of the Valley" knows that Blue places a very high value on the inviolability of their capitol, Washington. There are a number of excellent reasons why they should.

(a) With their capitol captured, the Blue govern-

mental machine would be dislocated and even if moved to another locality, the interference would be embarrassing.

(b) A large number of Blue citizens hold the opinion that the war should terminate even at the price of Gray becoming a separate nation permanently. At the present time inactive and silent, a hostile occupation of the capitol would encourage the open activity of this group, perhaps with disastrous results upon the prosecution of the war.

(c) Even more important is the probability that if the Blue capitol were captured, foreign powers would recognize Gray as a separate and independent country. Foreign recognition would have far-reaching results affecting the prosecution of the war. It might endanger the blockade Blue has enforced against Gray through his command of the sea; it might even lead to foreign intervention.

(b) Blue, early in the war, was defeated in close proximity to Washington and for several days the capitol was open to capture. The memory of the panic at that time is fresh in the minds of the Blue administration.

So here we have the third Imponderable: A keen, almost morbid anxiety on the part of Blue for the safety of its capitol.

Washington is particularly vulnerable. It lies on the very frontier of the two states; it has no natural defenses and it can be attacked easily, either from the direction of Manassas or from Harpers Ferry down the Valley of the Potomac. It is separated from its wholly loyal population by the border State of Maryland, which, while nominally Blue territory, is highly sympathetic with the Gray cause. One of the two lines of communications between Washington and the loyal states from which the army draws its replacements and supplies is a railroad and canal paralleling the Potomac and passing through Harpers Ferry. The Blue administration's fears are not entirely groundless.

(4) There is another Imponderable which has engaged General "Army of the Valley's" attention: the personality of the Blue commanders, their intellectual grasp of the situation and their strength of character. He knows the prestige of victory is with Gray. From the caution exhibited by the Blue commanders in previous campaigns he believes, confronted by unexpected and puzzling moves, the Blue generals will prove irresolute. Following this reasoning he feels they will place an over-emphasis on the importance of any aggressive moves Gray may make.

So the fourth Imponderable lies in the cautions, character and irresolute minds of the opposing commanders.

(5) The fifth Imponderable is the relative fighting spirit of the Gray and Blue troops. General "Army of the Valley," while not underestimating his adversaries' fighting ability, has faith in the superior morale of his own troops, for Victory so far has perched on their bayonets and they are fighting on their own territory in defense of their own homes. With good reason he believes the mobility of his own troops is superior to the enemy.

(6) He has faith in himself and in the justice of his cause. He feels that the driving power of his will to victory is stronger than his opponents', for he knows exactly what he wants to do and they are restricted by a cautious uncertainty.

(7) Together with these six Imponderables, General "Army of the Valley" has a deep religious faith which is rare in any age. He honestly and completely believes that Divine Providence will aid a just cause if reverently invoked. His whole life and character is built around the conviction that while the Divine Will operates through the works and minds of men, it is a direct influence which in the end is conclusive and final. His faith is that of Cromwell, "Trust in God and keep your powder dry."

General "Army of the Valley" then has seven Imponderables which he can use to offset the enormous inequality of material force which confronts him:

- (1) Divided authority and command in the hostile ranks;
 - (2) Divided councils and lack of confidence of Blue in their commander;
 - (3) The extreme anxiety of Blue for his Capitol, coupled with its vulnerability;
 - (4) The cautiousness and irresolution of the Blue commanders;
 - (5) His own faith in the fighting value and mobility of his troops and in his cause;
 - (6) His faith in his own will to conquer;
 - (7) His complete faith in Divine Providence.
- (We will see what use he makes of these Imponderables.)

Enemy Situation:

(a) Plans open to enemy.

General "Army of the Valley" knows enough of the enemy's general plan to realize that the main effort is directed on Richmond, the Gray capitol. He knows this effort is in the nature of a converging attack, partly overland, through Manassas Junction and Fredericksburg and partly by water to some base on Chesapeake Bay, and thence by land toward Richmond. He understands that from 125,000 to 150,000 men are available to Blue for these operations and that Gray has only 70,000 to 80,000 men to oppose them.

In his immediate front his cavalry reports evidence of the enemy withdrawing and detaching troops to the east. This may either mean that Blue is

- (1) evacuating the Valley entirely, or
- (2) detaching troops to reinforce their main effort, leaving a force to contain him.

(b) Analysis of possible enemy plans.

General "Army of the Valley" discards the first contingency as unsound from the hostile viewpoint. Why should they evacuate the Valley entirely? They have not been defeated and there is still his force there to be observed and contained.

He feels it is much closer to the truth that Blue is retiring to better consolidate his position, that he will leave a comparatively small force to observe and contain him and is detaching what troops he can spare to reinforce the main Blue effort.

This is the very thing his mission is to prevent. But he knows that all factors point to the fact that this detachment is in harmony with Blue plans and seems practicable, for why should not the "Army of the Valley," a mere 4,000 or 5,000 men, be contained by a relatively small force? Even should Blue overestimate his strength, no supposedly sane man could believe that such a small force as Gray can possibly have in the Valley could seriously interfere with the Blue plans.

Own Situation:

(a) Plans open to General "Army of the Valley."

1. He could observe the Blue force in the Valley keeping his main body intact and while constituting a threat to refrain from any close engagement involving his force seriously.

2. He could advance cautiously against Blue and while not committing himself too seriously might, by a show of aggressiveness, induce Blue to recall the detachments now moving eastwardly.

3. He could attack Blue vigorously and, by pressing the action, draw on himself not only the Blue detachments now moving from the Valley but other troops destined for the main Blue effort.

4. He might retire in conformity with the rest of the Gray army.

(b) Analysis of plans.

General "Army of the Valley" rejects plan No. 4 at once; while his orders previously received might be urged in extenuation of this course, it in no way conforms to his mission as he sees it.

Plan No. 1—keeping contact but avoiding an engagement—he rejects also. While in apparent harmony with that part of his instructions which states how his mission is to be performed, he considers it repellent to his real mission, i. e. to induce Blue to detach troops from his main effort.

Plan No. 2—a cautious aggressive—has certain advantages. It seems practicable. While he is not quite sure of the strength of the force Blue has left in the Valley to contain him, he feels he would not be running too great a risk. If he is outnumbered and repulsed he could, by a show of aggressiveness, still constitute a threat which would require watching by Blue. The cautiousness of the Blue commanders will probably cause them to recall at least some of the troops recently detached. Thus the plan would probably fulfill the mission as outlined in his instructions.

However, there are risks. However weak Blue's strength in the immediate vicinity may be he can call superior numbers to his assistance in a few days. A cautious attack which was not altogether successful might increase Blue's confidence even to the point where he would feel he could handle the situation without recalling the detachments.

But over and above all these considerations, General "Army of the Valley" knows his real mission, as he sees it, would not be fulfilled by any such program. What is needed, and needed desperately by Gray, is something which will cause a complete change in Blue's plans.

Plan No. 3—a vigorous attack.

Advantages. It is practicable; the force opposed to

him does not seem to be more than a rear guard. Also it will probably be unexpected, thus having the element of surprise. It will set in motion the Imponderables he has considered, for a strong aggressive movement is related to all the factors which make up these Imponderables.

(1) Blue will believe any offensive from the Valley, even if made by a small force, is the prelude to an advance by larger forces, striking at the rear of the advancing Blue armies. This will raise fears for the safety of Washington which can be reached via Harpers Ferry and the Valley of the Potomac or from Ashby's or Snickers Gap.

(2) It will be certain to diminish the confidence of the Blue administration and populace in their General in Chief. He will wish to continue his own plan, the move against the Gray capital, already well under way; they will wish to modify it for the greater security of Washington.

(3) These factors will inevitably operate to disintegrate the unity of Blue command. The President and Secretary of War will be unable to resist interfering directly with military operations.

(4) A bold attack will prey on the cautiousness of the Blue commanders. They will not understand it and the uncertainty will paralyze their initiative.

(5) His force is small, but it is all he has and all he can expect. While confronted with superior numbers, the enemy is scattered, he is concentrated. If he is to strike at all, now is the time. His faith in the mobility of his troops and their fighting spirit leads him to believe that he can risk an encounter and retain the initiative even if Blue concentrates on him.

(6) His faith in the morale of his troops and in his own will to conquer is based on confidence in himself and his cause, aided by Divine Providence.

There are certain disadvantages:

(1) If the Blue commanders act with resolution, he will shortly be confronted with superior numbers.

If the Blue administration penetrates his design and realizes how few the numbers are at his disposal, it may allow the plans of its general to proceed without interference. In that case, General "Army of the Valley" might win a local victory which would be too dearly purchased at the price of casualties without any corresponding benefit to the Gray cause. A mere tactical advantage, unless it affected the strategical situation, would be a barren victory.

(2) He may be defeated and open up the Valley to a Blue penetration, a contingency that might require detachments from the main Gray army, which they cannot spare, but might be obliged to dispatch to extricate him from the difficulty. He would then probably be blamed by the public for disobedience of orders.

We will not enter into the tactical Estimate of the Situation dealing with the factors which General "Army of the Valley" believe favor a tactical victory for his army. Suffice it to say that the enemy to his front was reported in but slightly superior numbers and that an envelopment of the hostile right, promised success.

General "Army of the Valley's" Decision:

"To attack the hostile force at Winchester enveloping its right flank and drive it north with the purpose of making a threat at Washington, drawing toward the Shenandoah Valley and to the defense of the Blue capitol troops destined for the main Blue effort."

* * *

In conformity with this decision on 23 March 1862, Stonewall Jackson attacked the Union forces at Kernstown. He found the enemy in greater strength and better handled than he had expected and, after a bitterly contested action, Jackson was defeated. But he had pressed the attack with great resolution and handled the Union forces roughly. Under the cover of darkness he drew off his army in good order and retired unmolested by the enemy.

He had suffered a tactical defeat where he sought a victory, but his aggressive boldness and his appreciation of the Imponderables had set mighty forces in motion. That night a Confederate soldier with the easy familiarity of that army and in that atmosphere of danger which, short of death, is the greatest leveler of rank, approached "Old Jack" who was warming his hands at a camp fire.

"General," he said, "the Yankees are in Winchester tonight."

"Winchester is a very fine place to be in," returned the General.

Nothing abashed, his visitor went on, "General, it was reported that the Yankees were retreating but I reckon they were retreating after us."

With his eyes fixed on the burning logs, Jackson replied slowly and impressively, "I think I may say I am satisfied, Sir."

There has been some doubt whether Stonewall Jackson realized the extent of his success at the time, but when he expressed himself as "satisfied" in the midst of defeat, he must surely have been looking beyond the affairs of the moment. He knew what he had done. He knew his carefully laid plans would develop. He knew that the Imponderables he had set in motion would reach out and close like a vise on the will of the authorities at Washington and paralyze the initiative of the Union commanders. And he was right. His aggressive move, so well timed, upset the

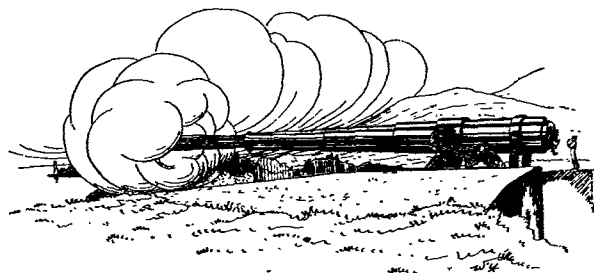
whole Union plan of campaign. They could not conceive that his attack at Kernstown was simply the bold move of a small force. To them it was an advance guard action, the prelude to an invasion of northern territory with Washington as its objective.

As Jackson had anticipated, Lincoln and Stanton took over the direction of the Union armies, thus destroying unity of command. They ordered back to the Valley all troops detached to aid McClellan in the Peninsula; they diverted McDowell and his corps which was McClellan's right wing and placed him covering Washington, violating the principles of co-operation and mass.

By the battle of Kernstown and subsequent moves, known as the Valley Campaign, Jackson paralyzed the initiative of the Federal command and had Stanton ordering troops over all northern Virginia. So, McClellan's army, deprived of McDowell's corps, was defeated by Lee, reinforced by Jackson, while it was astride the Chickahominy, and enough Union troops to crush Lee were searching vainly for Jackson over a hundred miles away and protecting a capitol which was not in danger. The Imponderables were working hard.

With a hostile force three times his own strength in the theatre of operations, Lee, with Jackson's aid, concentrated a superior force on the critical wing of the enemy and defeated him. Certainly strategy could do no more. It was not the heaviest battalions but the Imponderables rightly appreciated and properly applied, which won the victory.

The field of strategy is not the sole place the Imponderables work. They exist, not only in the rarified air of the high command, but in the more restricted spheres of the regiment, battalion, company and platoon. Those who command armies are few but any officer, no matter what his grade, is an important link in the military chain, and in campaign a junior may suddenly be confronted with a tremendous responsibility which no one can handle but himself. Often important issues hang on the decision of the man on the spot. A proper appreciation of the Imponderables by a subordinate officer may well be the deciding factor in a situation momentous in its consequences.



The Russian Plan of Campaign in the World War (1914)

By A. M. Nikolaieff*

THE importance of the initial military operations in a war, and especially in a modern war, can hardly be over-emphasized. A well-known military aphorism says: Mistakes made in the deployment of troops at the start of operations can not be righted in the course of the whole campaign.

In the World War a mistake made by the authors of the Russian plan of campaign made it impossible to reach a strategic decision on the Eastern front in the first year of the War, despite the victory over the Austro-Hungarian army in Galicia. The struggle had to go on, and this faulty plan of campaign was one of the causes which made its continuation inevitable.

In what did the mistake in the Russian plan consist, and why was this mistake made? In all the vast literature now available in English on the history of the War, no comprehensive answer to these questions is to be found; yet the subject is one of general interest, for the reason that a different plan of campaign might not only have brought an earlier victory to the Allies, but might have changed the whole subsequent history of Europe.

The obligations of Russia as an ally of France were defined by a military convention concluded by the governments of the two countries in 1892. The convention was signed three years after the Triple Alliance of Germany, Austria-Hungary and Italy came into being. The signing of the convention was prompted by the desire to oppose to the powerful Triple Alliance, which had replaced the so-called "Alliance of the three emperors" (Germany, Austria-Hungary and Russia), a political combination which would counterbalance the powers of Central Europe and prevent them, should they act offensively, from inflicting a separate defeat either upon France or upon Russia.

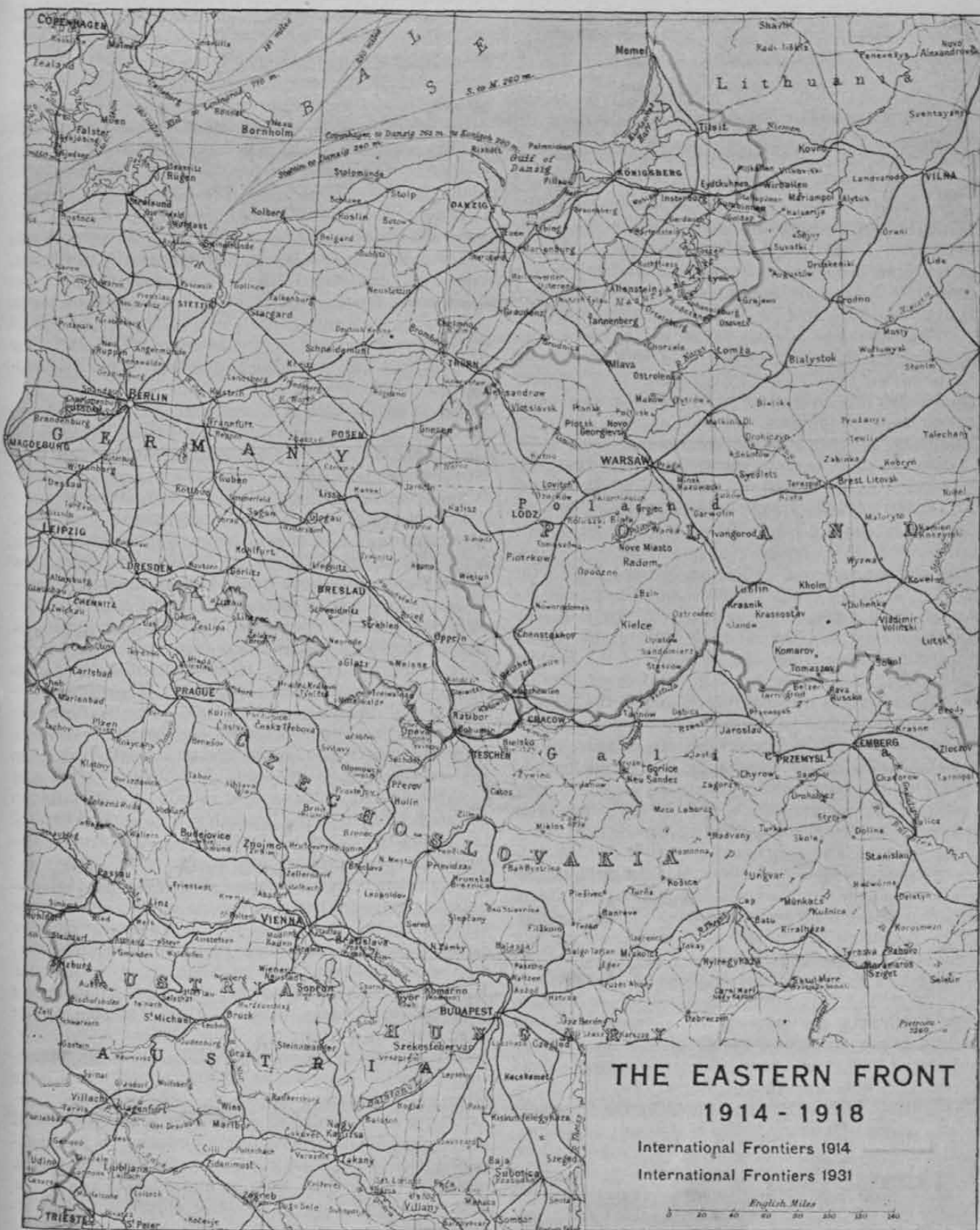
Although the military convention, as an insurance against separate defeat, was of equal importance to both Russia and France, the political attitude of the two countries toward the powers of the Triple Alliance was not identical, nor could their strategic plans for joint military action in case of a war with Germany and Austria-Hungary be easily reconciled and harmonized. France, fearing Germany, was anxious that Russia should direct her plans against that country, but Russia, on the other hand, had little expectation of finding herself at war with Germany alone. Had there been no alliance between Russia and France, a

war between Germany and Russia might have come only as a result of a war between Austria-Hungary and Russia in connection with the Balkan question, in which both those powers were vitally interested. This actually happened in 1914: the decision of Russia to stand by Serbia and to protect her independence caused Germany to give unconditional support (a "blank check") to Austria-Hungary and eventually to declare war on Russia, that is, to start the World War.

But neither the political nor the economic interests of France conflicted with those of Austria-Hungary, and the importance of helping Russia in a war against Austria-Hungary, was not given much attention by France, though such a war was more likely to occur than a war between Russia and Germany. According to the first French project for a military convention, no help was to be given to Russia by France in case of an attack on Russia by Austria-Hungary, while, on the other hand, Russia was to direct almost one half of her armed forces against Germany in the case that country should attack France. It was with no little difficulty that General Obrucheff, chief of the General Staff of the Russian army under Emperor Alexander III, succeeded in amending the French project so that the draft of the military convention became acceptable to both parties. The agreement signed in 1892 provided that France would help Russia by directing all her available ("*disponibles*") forces against Germany, not only in case of an attack on Russia by Germany, but also in case of such an attack by Austria-Hungary supported by Germany. Russia, on her part, in the case of an attack on France, was to direct all her available forces against Germany as soon as possible, in order to compel Germany to fight at the same time in the West and in the East. The great advantage of the agreement, in its modified form, was that it did not restrict the freedom of Russia's choice of a plan of military operations or of a date of starting the offensive.

The military convention between Russia and France remained in force throughout the whole period from 1892, when it was signed, down to the outbreak of the World War in 1914. But, as a result of supplementary agreements, worked out at conferences which were held periodically by the Chiefs of the two General Staffs, Russian and French, and recorded in special "protocols", Russia took upon herself additional obligations which not only tended to bind her freedom of strategic action but, under the circumstances, were not even capable of being accomplished. According to those protocols "the defeat of the German troops remained under all circumstances the first and funda-

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mental goal of the Allied troops[†]; and accordingly it was provided that Russia, concentrating 800,000 men against Germany, was to start an offensive either in East Prussia or in the direction of Berlin on the 15th day of mobilization. Now, by the 15th day of

mobilization only one third of the Russian army in the field could be concentrated on the Western frontier of the Empire, and less than one half (350,000) of the Russian forces destined for action against Germany

[†] Protocol of August 31, 1911.

under the protocol could be deployed by that time, with the organization of their rear still incomplete. Yet on that day the Russian troops facing Germany were to start their march with the purpose of invading that country.

The new obligations of Russia were a concession made by her under the influence of the insistent requests of the French representatives, who feared above all that Germany, taking advantage of the slow progress of the Russian mobilization, might throw all her forces against France and defeat her army before the Russian army would move forward. The French representatives were therefore anxious that Russia, upon the declaration of war by Germany, should expedite her mobilization, and begin action at the same time as the French army. With that end in view the French even promised their support in the matter of arranging a French loan to be used by Russia in constructing strategic railways which would make possible the mobilization and concentration of the Russian army within a shorter time. In 1912 special funds for that purpose were granted Russia in the form of an annual loan of 500 million francs, and President Poincaré informed Emperor Nicholas II of the fact by a personal letter.

The Russian plan of campaign, formed under the influence of the French requests and known as the plan of 1910, was severely criticized by the commanders-in-chief and the chiefs of staff of the several military areas into which the territory of the Empire was divided. A conference of the chiefs of staff of the military areas was therefore called in 1912 in Moscow, and at that conference a project for a new plan was worked out. The project was based on fundamentals set forth by General M. V. Alexeieff, chief of staff of the Kieff military area and later, during the World War, chief of staff of the Emperor after the latter assumed the command of the Russian army in the field. These fundamentals, serving as points of departure for the new plan, may be summarized as follows: First, Germany will direct her main forces in the beginning against France, and will confine herself to defensive action against Russia; accordingly Germany will have the advantage of the topographical obstacles and the strong fortifications of East Prussia and will be able to resist even a numerous Russian army of invasion in that quarter; moreover, because of the flanking position of the fortified East Prussian territory, no advance from Western Poland (from Warsaw) in the direction of Berlin may be undertaken so long as East Prussia is held by the Germans; second, Austria-Hungary is the real enemy of Russia, and, if account be taken of the number of troops which she will bring into action against Russia in the initial period of war, then she is the most dangerous enemy as well: the defeat of Austria-Hungary is of the greatest importance, inasmuch as it may result in the disintegration of the Dual Monarchy and the solution of the Slav problem. Upon the ground of the above considerations General Alexeieff maintained that the fundamental idea of the plan of 1910 should be changed, and he proposed that in the beginning the

main attack should be made on Austria-Hungary and that there should be directed against that country as many forces as possible; as to Germany, military operations against her should be confined in the beginning to the protection of the Russian frontier and to a limited action against the German troops left in East Prussia; only six army corps were to be assigned for the latter purpose, according to Alexeieff's plan.

The project of the Moscow conference did not receive the approval of the Chief of the General Staff, but it could not possibly be disregarded. A new plan, known as plan of 1912, was therefore worked out by the General Staff. That plan, with the revisions made prior to the outbreak of war in 1914, may be regarded as a compromise between the ideas on which the plan of 1910 had been founded and those set forth at the Moscow conference.

The plan of 1912 was prepared in two versions: version "A", to be put into effect in case the greater part of the forces were to be directed against Austria-Hungary, and version "G" for use in case the major forces were to be directed against Germany. Version "A" was the one actually put into operation in 1914. According to that version, 33.52 per cent of the forces deploying in the initial period of the campaign (that is, 19 regular divisions and 11 of the second line,—30 infantry divisions altogether, out of a grand total of 89½)* were to form the North-Western group of armies (or the North-Western front) with the object of invading East Prussia; 50.84 per cent of the forces (45½ infantry divisions, including 32½ regular divisions and 13 of the second line) were to form the South-Western group of armies (or the South-Western front) and were to advance against Austria-Hungary; the remaining 15.64 per cent (7 regular divisions and 7 of the second line) were to remain in Finland, the Baltic provinces and Bessarabia with the object of protecting the flanks of the two groups of armies destined for active military operations.

That distribution of forces clearly shows that the plan of campaign had two objects in view, both to be achieved at the same time: one, to undertake decisive action against the German troops in East Prussia; another, to inflict a crushing defeat upon the Austro-Hungarian army in Galicia. Now, the fundamental principle of strategy demands that a strategic plan shall have at a given time only one main objective, and that as many forces as possible should be concentrated for the achievement of that aim; as to all the other objectives, they should be considered of secondary importance, and only a minimum of forces should be assigned for their execution. Contrary to that fundamental demand of military art, the Russian forces, according to the plan, were to be split into two major groups. Which then of the *two* objectives was con-

*At the time of the mobilization in 1914 there were in the Russian Army 70 regular infantry divisions, and 18 regular infantry brigades, forming the equivalent of 9 infantry divisions, or a grand total of 79 regular infantry divisions. Out of that total 58½ divisions in the initial period of war were to be deployed in the European theatre of war, and the remaining 11½ divisions were to protect the frontier of Asiatic Russia in Siberia, Turkestan and the Caucasus. The formation of the 31 infantry divisions of the second line to reinforce the regular troops was to be started at the beginning of mobilization.

sidered the main one? Judging from the larger per cent of troops assigned to the South-Western front (50.84), one would be led to conclude that of the two objectives set by the Russian plan, the defeat of the Austro-Hungarian army was considered of greater importance than the invasion of East Prussia. General Y. N. Daniloŋ, who was the Quartermaster General of the Russian General Staff throughout the five years preceding the War, and in that capacity was responsible for the working out of plans of operations, appears to support this conclusion when he says* that the Austro-Hungarian army represented, under conditions existing during the years immediately before the War, the chief active enemy force on the Russian front, and could deprive the Russian army of liberty of action; yet on the other hand plainly states** that "the guiding idea of the strategic deployment of the Russian army was the desire to insure the most favorable conditions with respect to (numerical) strength for the combats in East Prussia". In trying to explain the splitting of the Russian forces, he further states that the Austro-Hungarian theatre of operations "from the point of view of the coalition of powers (the Entente)" was one of "secondary importance", and that "it began to assume the rôle of the main theatre on our (the Russian) front only when the failure of the North-Western group (the Russian armies in East Prussia) became clear".** Thus, by showing that Germany could not be defeated at this stage of the War, in East Prussia, events had shown that the defeat of the Austro-Hungarian army, not the invasion of East Prussia, should have been the main objective, and that, to insure its attainment, the forces diverted for action against Germany in the initial period of the War should have been limited as closely as possible.

Fifty per cent of the Russian forces which would be deployed in the European theatre of war did not present a power sufficiently strong to inflict upon the Austro-Hungarian army a crushing defeat. This General Daniloŋ fully admits as he says† that the plan in relation to Austria-Hungary was a "daring" one—that is, a risky undertaking, and that "the task set for the (Russian) troops of the South-Western front had been formulated not in accordance with their numerical strength, but in the expectation that their spirit would be superior" to that of the Austro-Hungarian troops, made up as the latter were of elements belonging to many nationalities, among them Slavs whose sympathy might be on the side of a related nationality, the Russians. The war showed that that expectation was not well founded, the Austro-Hungarian troops having proved that, although not the equal of the German troops, they were an enemy who could not be put easily to rout.

The 33 per cent of the Russian forces assigned to the North-Western front (making up 9 army corps, instead of the 6 corps assigned to that front in General Alexeieff's plan), likewise could not be considered an adequate force for achieving decisive results in East Prussia, although their numerical strength exceeded that of the German troops which were expected

to be left in the Eastern theatre. It is known that a heavy reverse (the defeat of Samsonoff's army at Soldau-Tannenberg in August, 1914) was suffered by the Russian troops on the North-Western front in the beginning of operations. But even if this reverse could not have been foreseen, it should have been evident in advance that the occupation of such a stronghold as East Prussia by the Russian forces assigned for that purpose would hardly be possible at a time when one half of the Russian army in the field would be engaged in a decisive battle with the Austro-Hungarian army. Yet it was also true that no invasion of Germany on a grand scale could be undertaken prior to a complete and secure occupation of East Prussia.

Finally, consideration should be given to the dates on which it had been planned the Russian forces would be ready to begin active operations on the two fronts. They were as follows: the regular troops of the North-Western front were scheduled to complete their concentration on the 20th day of mobilization, those of the second line—on the 36th day; the regular troops of the South-Western front were scheduled to be in complete readiness on the 29th day of mobilization, those of the second line—on the 38th day. Now, the Russian army, as has been already said, was to start an offensive against Germany on the 15th day of mobilization, according to a promise given by the Chief of the Russian General Staff, General Zhilinsky, to the Chief of the French General Staff, General (later Marshal) Joffre.‡ It follows that the offensive was to be launched before the concentration of the Russian army had been carried out. This actually happened in 1914; the Russian forces started the offensive on August 14th, which was the 15th day of mobilization, and crossed the frontier of East Prussia: the 1st army on August 17th, the 2d army on August 21, at a time when the formation of the supply columns and the organization of the rear establishments of these armies required seven more days to be completed and no division of the second line was ready to advance. The fact that the offensive was undertaken prematurely was one of the main causes of the reverses suffered by the Russian army in East Prussia in 1914.

The question arises how did it come to pass that a plan of campaign the basic conception of which was faulty, inasmuch as it was a violation of the fundamental principles of strategy, was actually adopted. An answer may be found in the statement made by General Daniloŋ, himself one of the authors of the plan, in his book, "Russia in the World War." He writes as follows:§ "Russia, having become an ally of France, took upon herself a serious and heavy obligation; she had to bear in mind, as she considered measures of preparedness for war, the necessity of a swift and energetic offensive against Germany..... In order to accelerate our offensive against Germany,

* Daniloŋ, Y. *Russia's Part in the Initial Period of the World War*. ("The Marine Corps Gazette", Washington, D. C., 1923, v. 8, no. 2, p. 56.)

** Daniloŋ, Y. *Suzhdeniya Posle Sobytiy*. ("Vozrozhdenie," a Russian daily. Paris, 1930, no. of March 21.)

† Daniloŋ, Y. *Suzhdeniya Posle Sobytiy*.

‡ Daniloŋ, Y. *Rossiia v. Mirovoi Voine* (Russia in the World War). Berlin, 1924, p. 80.

§ Daniloŋ, op. cit., p. 81, 80, 78.

—our ally, France, had opened a large credit in favor of our Government for the purpose of constructing railways of strategic importance. This financial assistance....was a heavy burden weighing upon the free creative power of the Russian strategy....In point of fact at the conferences (which were held periodically by the Russian and French representatives) it always came to this: France would express her wishes, and Russia would consider to what degree and in what ways they could be accomplished. There is no doubt that such a state of things necessarily fettered our strategy and the free use of our forces in the initial period of war."

Thus it is clear that had not the Russian strategy been hampered by the requests of France, a different use of the Russian forces might have been made, in other words, it is probable that no splitting of them would have taken place. The only reason for dividing the Russian active forces into two large groups was the anxiety of France that Russia, from the very beginning of military operations, should keep engaged on the Eastern front as many German troops as possible (five or six army corps at least), with a view to preventing Germany from directing and using all her forces against France; and in order to achieve that purpose, an attack on Germany (in East Prussia) was decided upon as the best way of action, Austria-Hungary being looked upon by France as a secondary theatre.

Would it not have been possible to devise a plan which would serve the needs of France and yet avoid the splitting of the Russian forces? It seems that the working out of such a plan would have been possible, if instead of regarding the actions against Germany and Austria-Hungary as two different, semi-independent campaigns, France and Russia had looked upon their two enemies as one armed force (which they really were) fighting in the beginning of the war on two fronts, directly opposite to one another—in the West against France, and in the East against Russia. Now, an attack with the great majority of her forces on one of the fronts (the Western as it was in 1914) could be undertaken by Germany only on condition that her rear (the Eastern front) be protected not only by the few army corps left in East Prussia but by the entire Austro-Hungarian army as well. It is obvious that Germany could not possibly take the risk of leaving her Eastern frontier open to invasion, if the whole Russian army were free to act against her alone. Germany could take this risk only because the Austro-Hungarian army, by attacking and engaging the greater part of the Russian army, would serve as a protection of Germany's rear. Consequently, the destruction of the Austro-Hungarian army in the beginning of the war would have constituted destruction of those very forces which, making the rear of Germany secure, enabled her to use nearly all her own regular forces against France. As a result a considerable fraction, if not the greater part of the German troops in the West would have of necessity been shifted immediately to the East in order to bar the advance of the Russian army on Berlin. Having disposed of

the Austro-Hungarian army, it would have been possible for the Russian forces to undertake such an advance, using the shortest routes (by way of Silesia).

How sensitive Germany was to the security of her rear (in the East) the following fact may show: The initial success of one of the Russian armies (the 1st) in East Prussia (the battle at Gumbinnen on August 20th), at the very time when the greater part of the Russian force was to engage in a decisive battle with the Austro-Hungarian army, caused the German General Headquarters to withdraw two army corps (the Guard Reserve and the XI corps) from the Western front and rush them to the East.

It would naturally be asked whether a concentrated attack by Russia on Austria-Hungary would have brought pressure to bear on Germany quickly enough to enable France (with no assistance from a Russian invasion of East Prussia) to withstand the German onslaught? The answer is, yes—if in the beginning of the war France had acted only defensively.

In 1914 the Austro-Hungarian army was defeated by the Russians by September 12th. On that day, which was also the date of the telegram from the French General Headquarters informing the Russian Commander-in-Chief of the victory on the Marne, the Austro-Hungarian army was in full and disorderly retreat toward Cracow, its base. It may therefore be assumed that had the Russian force which fought against the Austrians been materially stronger (and the force assigned to face Germany therefore considerably weaker) the Russian armies on the South-Western front might not only have defeated the Austro-Hungarian army by September 12th, but might have prevented it from retreating toward Cracow; that is, the Russians might have cut off the Austro-Hungarian army from its base. And this would have put an end to the fighting of Germany's ally.

If the plan here suggested had been followed, the French army would have of necessity been limited to defensive action during the period of the decisive battle between Russia and Austria-Hungary. The object of this action by the French would have been to hold out against the invading army until a decision had been reached in the East. The well-known slowness of the Russian mobilization made it essential that during the initial period of war France should be on the defensive. Had the French remained on the defensive, they would have had on their side the two following advantages: first, the possibility of making full use of the barrier of fortresses between the Swiss frontier and Luxemburg (Belfort, Epinal, Toul, Verdun), and, second, the possibility of assigning a large part of their forces to the strategic reserve to be moved against the invading enemy according to circumstances.

Now, the French plan in 1914 was just the opposite to what it should have been. In complete disregard of the slowness of the Russian mobilization, the French scheme was based on the idea of an immediate and decisive offensive. Its central idea was that all the concentrated forces of France should be moved forward for an attack upon the advancing Germans who, it was expected, would concentrate along the Franco-German

frontier and attack from the East; the French forces therefore were to meet the enemy attack by an advance between the Vosges and the Moselle river on the French right flank and to the north of the line Verdun-Metz on their left. The concentration of the French army was actually planned and carried out with this purpose in view. The attack of the Germans through Belgium, aimed at Paris from the North, came to the French as a complete surprise.* If despite its extremely unfavorable position, the French army was able to win the victory of the Marne—it stopped the German attack on September 6th and forced the enemy to retreat on September 8th—it may be safely assumed that, if they had avoided the great disadvantage of concentrating their forces in a wrong zone and had kept at their disposal a strong strategic reserve, the French would have been able to hold their own until September 12th, or even longer—that is, until the Russians had put an end to the Austro-Hungarian army.

Under the plan proposed the German forces facing the French would not have been reduced by the two army corps (the XIth and Guard Reserve) which as a result of the Russian invasion of East Prussia were rushed by the German General Headquarters on August 25th to the Eastern front, but this would not have changed the situation materially if France had acted on the defensive, inasmuch as the French General Headquarters might have opposed to the 78 German divisions** which had invaded France a force of an almost equal strength. In point of fact in 1914, at the time of the German invasion, the French had 84

divisions,† not counting the 6 Belgian and 4 British divisions; that is, the French had a superiority over the Germans in the number of divisions, but because the German artillery was the more powerful,§ the opposing forces might have been considered as almost equal in strength.

In the opinion of the German General who was in 1914 the Chief of the Military Operations Section of the German General Staff‡ the cause of the German reverse on the Marne was the absence of the two army corps which had been withdrawn to face the Russian front on August 25th. Yet this officer also maintains that “had the battle on the Marne ended without any favorable (*positifs*) results for the French and the British,” even then “the war itself would have continued.” With this opinion of the German General, no military expert of the opposite side is likely to disagree. On the other hand, it seems equally certain that had the Austro-Hungarian army met its “Sedan” in Galicia, Germany, left alone, would hardly have gone on fighting, and the War might thus have ended in the year in which it began.

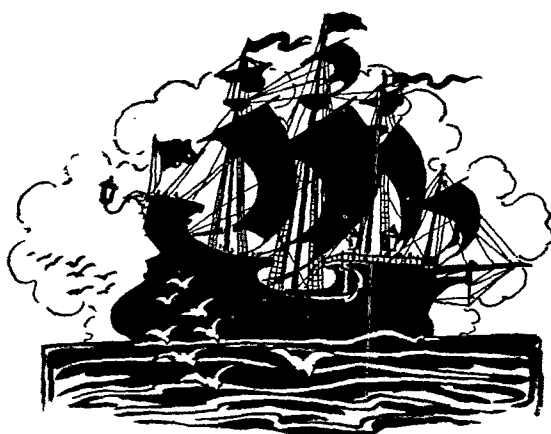
* A study in peacetime of the net of German railways leading to the Belgian frontier and of the fortifications of Thionville and Strasbourg might have shown that it was the German plan to invade France from the North.

** 45 regular divisions, 27 reserve divisions and 6 ersatz-reserve divisions.

† 47 regular divisions, 25 reserve divisions and 12 territorial divisions.

§ 14 batteries to a German division including 3 batteries of light howitzers and 2 batteries of heavy guns against 12 light batteries to a French division.

‡ General Tappen. *Jusqua a la Marne en 1914*. In: *Documents allemands sur la bataille de la Marne*. Paris, 1930, p. 119-111, 124-126. General Tappen was the Chief of the Military Operations Section from the beginning of the War to the autumn of 1916.



A Decade of Army Schools

By Lieutenant Colonel Bernard Lentz, Infantry

ABOUT ten years ago our army schools began to flourish in a manner undreamed of before the World War. This war having brought out the necessity for a broader program of training and education, especially for officers, we went at it with a will and soon the officer who wasn't either preparing to go to a school or coming from one became quite the exception.

At that time, having the firm conviction that our schooling was being overdone, I wrote an article entitled "Who is going to soldier when everybody is going to School?" This article brought forth "brickbats," particularly from those who had been through our pre-war schools, and "bouquets" especially from



Army War College

those who sensed the necessity for becoming educated but who lacked, perhaps, the enthusiasm for doing so.

I have since gone through the schools and now, after more than ten years have passed during which our schools have undergone changes and have been placed on a more permanent basis, I feel that an article on the present subject will not be out of place.

Jonathan Swift, the English satirist has told us: "If a man would register all his opinions upon love, politics, religion, learning etc. beginning from his youth and so go on to old age, what a bunch of inconsistencies and contradictions would appear at last." It is with Swift's idea in mind that I undertake my present task.

I sometimes wonder if we fully appreciate the extent to which our schools have contributed to the up-building of our national defense. We are wont to speak of national defense in terms of man power, trained and untrained and supplies either on hand or planned for and often fail, because we lack a definite yardstick, to

measure adequately the great national defense asset we possess in our corps of schooled officers.

No study of our state of preparedness can be complete without entering on the credit side of the ledger this large item of military education which, when taken at its full value, goes far to make a good showing when the ledger is balanced.

Our schools have been worth all the money and all the efforts we have expended. This was forcefully brought to my attention sometime ago when I participated in a tactical inspection of an infantry regiment. After the inspection the general—one of the best known tacticians in the army—pronounced the organization fit, in every way, to take the field, and yet the organization had had practically no field training for many months prior to the inspection. The regiment, snow bound for months in winter and conducting camps of every description during the summer, simply hadn't found the time for tactical training.

The commanding officer, all the battalion commanders and a large majority of company commanders and staff officers had recently joined the organization. The inspection being imminent, some tactical exercises had been planned but had to be mostly omitted because of inclement weather. And when, in spite of an almost total absence of field training coupled with the fact that a majority of the officers were new to the organization, the regiment was pronounced fit for the field there could be but one conclusion. It was this: While the officers had not played their respective parts in the team prior to the inspection, they did show up well during the inspection because at school they had learned among other things, two very important ones viz. a uniform technique and a knowledge of their respective roles in relation to the regiment as a team.

Not only in the Regular Army but also in the National Guard and Organized Reserves, the influence of our schools has spread; directly, through the hundreds of National Guard and Reserve officers who have passed through the schools and indirectly, through the teachings of our regulars who serve with these components.

The objections to our greatly enlarged school program, which were quite violent ten years ago, have gradually disappeared, "and fools who came to scoff remained to pray," now aptly describes the change of sentiment that has taken place.

It is interesting to note the changes that have taken place in the conduct of our schools since the close of the world war. Foremost among these changes is a broader definition of education on which, more and more, our school methods of instruction are being based. I feel that those in charge of our schools are recognizing, while military training and military education must go hand in hand, that there is a dis-

tinct difference between training and education; that there is a proper place for both and that both must be fostered if our schools are to achieve the best possible results.

In this connection, let me quote from an article by Dr. A. Flexner, Director of the Institute for Advanced Study, published in May 1932 number of the *North American Review* and entitled, "The University in American Life." "Training is, let me repeat, concerned with skills, technique and devices. One trains cooks, one trains plumbers, one trains bookkeepers, one trains business men; but one educates scholars, one educates philosophers, one educates economists, one educates physicians." Applying this line of reasoning to the military we might say that one trains army officers for general utility and one educates army officers for leadership and responsibility.

Without in any way belittling its importance, training as Dr. Flexner observes "is on a distinctly lower intellectual level and aims at a distinctly lower, because an immediate, goal than does education."

The end to be gained through military education (bearing in mind the distinction that has been made above between training and education) is, a liberal outlook on the part of those who are to hold important positions in our military set-up.

An English writer—Wickam Steed—has given us a good definition of a liberal outlook. He says "A liberal outlook is a matter of mental and moral poise. It is compounded of tolerance; of a belief in individual freedom; of a conviction that all things human are relative and that the tyranny of fixed absolutes cramps men's minds. It recognizes that within given limits of space and time, certain principles may be accepted as rules of unquestioned expediency, subject always to deterioration when circumstances change."

Unless we study this definition of a liberal outlook rather carefully and at the same time bear in mind

the pages of history, we find that all real leaders, military or otherwise, have been made of the same stuff. They were men of character; they were trained, yes, but last and not least they were educated.

In this connection let me give two quotations. The first is from General Von Seeckt who in his book, "Thoughts of a Soldier"—a book well worth reading—tells us: "The value of the knowledge acquired by study must not be over-estimated. The soldier faced



Photo by Signal Corps, U. S. Army
The Infantry School, Fort Benning, Ga.

with the necessity for independent decision must not mentally search the pages of his professional encyclopaedia nor seek to remember how the great generals of history, from Alexander to Zieten, would have acted in a similar case. Such knowledge as that derived from the study of the history of war is only of living practical value when the wealth of detail has been incorporated with a man's own mental resources."

The second quotation is taken from York von Wartenberg's "Napoleon as a General": "The rational employment of general principles marks the difference between the genius of the true artist and the lack of freedom of the mechanic who is dominated by rigid rules, and the bungler who despises all the rules and denies their justification."

Undeniably, the authors of both the aforesaid quotations had in mind the educated man and not simply the trained man. The conception of education brought out by these military writers is the same as that enunciated by Dr. Flexner. In other words to develop leaders military or otherwise, we must have more than training, we must insist on education.

We should recognize that among our army officers we shall always have first, those who can be trained and no more, second those who can be trained and educated and third, those who can neither be trained nor educated. For the first class there will always be sufficient jobs in our army because as everywhere else much important work must always be done by the dependable trained man. The officer who shows by his work, not only in school but year in and year out, that he belongs in the second class should be encouraged to go to our higher schools to become educated. The third class which I am happy to feel is quite small, should be eliminated.



Photo by Air Corps, U. S. Army
Command and General Staff School, Fort Leavenworth, Kansas

the conception of education, as distinct from training, we are likely to come to the snap conclusion that here we have ideas that may be appropriate for use at Harvard or Oxford but have absolutely no application in the military service. Search as we will through

Our system of schools is intended to do just these things. We shall succeed, more and more, in accomplishing the desired results as we understand, better and better, the relationship between training and education.

If we linger too long in the field of training for those who are capable of being educated we shall find that the student, when he reaches the higher schools will have difficulty in learning to think for himself, to acquire the liberal outlook, to become educated. The idea of education should go hand in hand with training in our lower schools so that the young student will learn to appreciate early in his career that if and when he goes on to the higher schools he will more and more be expected to stand on his own intellectual feet.

I have always thought that hitching our general staff eligibility to our schools was a mistake for the simple reason that the student is likely to feel that he had better accept what is given out as doctrine or he may find himself not on the eligible list when the course is over. The measure of a school is not in what the student does in school so much as what he does after he leaves the school—the result of the stimulation of his thinking machinery received while a student. To my way of thinking the general staff eligibility law should be repealed if for no other reason than it will encourage true education in our higher schools.

We know that in Europe, for years prior to the World War, general staff eligibility depended largely on school achievement and we may have gotten the idea from Europe. But Europe may have been wrong. I inject a remark by General von Seeckt in speaking of the German army: "Perhaps in an age when so much was done to develop the general staff, too little was done to extend the training of commanding officers". Our schools train for both but do we not give the general staff a special halo through the eligibility law?

Our general staff officers should be trained but what is more important they must be educated—they must possess the liberal outlook—if our present logical general staff system is to function in time of great stress.

To sum up: Our schools have made wonderful progress during the past decade. They leave little to be desired by way of training which is important, but what is really significant, our schools have grasped the idea that education is not so much the acquisition of knowledge but deals largely with the process of stimulating the student to think for himself. This is indeed an auspicious trend for if we continue to follow it, our officers' schools will turn out to an increasing extent—not an over-trained and under-educated product—but a corps of officers who fully understand the proper balance that should always be maintained between training and education.



The Effect of Concussion on Hearing

By Major Knibloe P. Royce, 908th Coast Artillery (AA)

EDITOR'S NOTE: *The publication of this article is not an attempt to encroach upon the field so well covered by our esteemed contemporary, THE MILITARY SURGEON. However the limitations of the human machine sometimes are of great importance in designing machines of steel to meet our requirements. For this reason physical limitations are of interest to officers of all arms. As an example, it has been suggested that the lag in human physical reactions may eventually limit the speed of aircraft. The effect of concussion on hearing is a subject within the practical experience of all artillerymen. It may not be generally known that the effect of the concussion of our new high velocity antiaircraft gun was a serious consideration when the 61st Coast Artillery fired thousands of rounds while the gun was under test at Aberdeen Proving Ground. Battery Commanders were somewhat disturbed when injury to the ears and hearing resulted and when the cannoneers showed a disinclination to serve the gun during firings. It was necessary for the Ordnance to change the design of the gun platform and to devise protective measures obviating the serious effects of concussion.*

Major Royce in his civilian occupation, is in close contact with the Bell Telephone Laboratories, an organization devoted to research in scientific fields and which has been more than generous in rendering available to the government the results of its studies. Major Royce is also an avid devotee of the antiaircraft artillery. He has presented the following technical explanation of the effects of gun fire on hearing, believing that all artillerymen may profit by a better understanding of this subject.

ACCORDING to Dr. Harvey Fletcher, Director of Acoustic Research of the Bell Telephone Laboratories, "artillery gun fire is one of the loudest sounds the human ear can tolerate."

Unfortunately for gun crews—particularly on some of the newer antiaircraft guns of extremely high muzzle velocity—many ears are unable to tolerate the frequent and intense concussion to which they are exposed under present day conditions.

The ejection of a shell from a gun is accompanied by a pressure wave of large amplitude. The pressure sometimes amounts to over fifteen pounds per square inch. This means that the absolute pressure is more than double normal atmospheric pressure and that the rarefaction phase of the wave will approach zero pressure. The magnitude of this pressure variation from the standpoint of the ear can be appreciated better when it is realized that the normal ear responds to a sound pressure of as little as one millionth of an atmosphere at very low frequencies. The sensitivity over the range from 100 to 10,000 cycles per second is even greater.

With high muzzle velocities the wave front becomes abrupt and at large amplitudes this effect is accentuated, since the compression wave tends to travel faster and the rarefaction slower than the normal propagation at small amplitudes. Thus, the wave form, instead of approximating a sine wave, has a steep front. This fact means that the change from minimum to maximum pressure is very abrupt and that the decrease from maximum to minimum is considerably slower.

When the ear is exposed to repeated explosions for any considerable length of time, the result is almost invariably a congestion in the ear drum and other parts of the ear. This is due to the sound waves which, as they strike the ear, subject it to rapid alternations of pressures very much higher and very much lower than normal.

If these pressure variations are great enough, they will cause rupture of the ear drum or even damage to the internal ear. A ruptured ear drum can usually be restored to normal by appropriate treatment; it tends to spontaneous closure, and normal or very nearly normal hearing will be usually regained.

In the World War most ear injuries occurred in the field from explosions of H. E. shells rather than from the service of the piece. "Gunners had been taught," says Dr. J. Gordon Wilson, "to protect their ears by wearing cotton or wax plugs and by opening their mouths at the time of firing their pieces, the latter affording a very satisfactory degree of protection."

The protection afforded is principally protection against bursting the ear drum, since the external and internal pressures on the ear drum will be equalized through the eustachian tubes, provided the tubes are open. It also reduces the pressure on the oval window (see description of hearing mechanism below) to approximately the pressure of the explosive wave instead of a pressure thirty to sixty times as great, which would normally be applied to it on account of the mechanical leverage of the ossicles.

However, some studies of ear damage have indicated that where the ear drum has been ruptured, the inner ear—the perceptive mechanism—has been protected as though by a shock absorber. Since damage to the inner ear is usually permanent, and damage to the drum or middle ear is usually curable, this suggests that opening the mouth may be inadvisable as a protection against severe acoustic shock.

"Doctors disagree" as to the exact function of the various parts of the hearing mechanism, but there is general agreement as to the physical structure.

"The ear mechanism* may be divided into three general parts: the outer ear, the middle ear, and the inner ear. The outer ear consists of the external part, or pinna, and the ear canal or auditory meatus. The middle ear contains three small bones or ossicles, called, respectively, the hammer, the anvil and the stirrup. The inner ear contains the cochlea, the vestibule, the semi-circular canals and the endolymphatic duct and sac. In the cochlea are located nerves which give us the sense of hearing, and in the semi-circular canals are located nerves which cause reactions concerned with the maintenance of equilibrium.

"Figure 1 shows a schematic diagram of the parts of the ear with the inner ear much enlarged.

"The ear canal, or auditory meatus, G, is about

*From "Speech and Hearing," by Dr. Harvey Fletcher; D. Van Nostrand Company, New York, 1929.

three centimeters long. It is closed at the inner end by the ear drum or tympanic membrane. Attached to the drum from its center and upwards by a long part called the handle is the first of the ossicles, called the hammer. The top of the hammer is connected with the anvil by a joint and the anvil in turn is connected

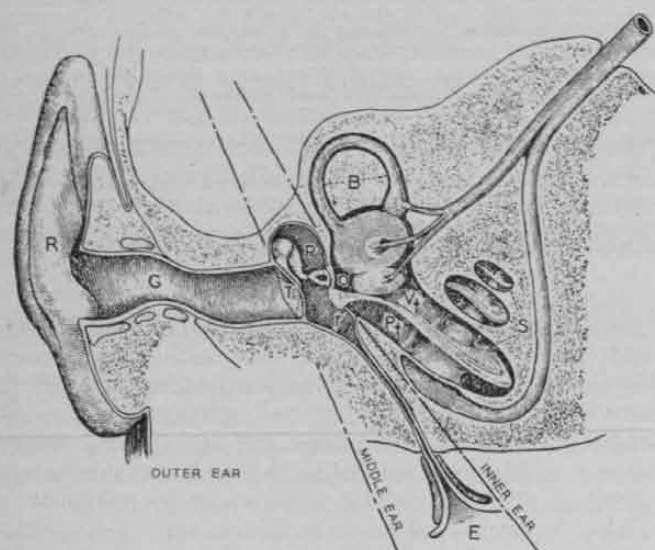


Fig. 1.

Semidiagrammatic section through the right ear (Czermak). G-External Auditory Meatus; T-Membrana Tympani; P-Tympanic Cavity; o-Fenestra Ovalis; r-Fenestra Rotunda; B-Semi-circular Canal; S-Cochlea; Vt-Scala Vestibuli; Pt-Scala Tympani; E-Eustachian Tube; R-Pinna.

to the stirrup, the small bone that conveys the motion through the oval window to the labyrinth in the inner ear. Due to the fact that the area of the stirrup which plunges into the fluid of the inner ear is about one-twentieth of that of the ear drum and also due to the lever action of the three bones, the pressure exerted by the oval window upon the fluid of the inner ear is from thirty to sixty times that exerted by the air upon the ear drum. The part of the stirrup lying in the oval window is flat and is called the foot plate. It is held in place by an annular ligament of the membrane which prevents the fluid of the inner ear from coming into the middle ear. The mastoid cells are connected to the middle ear, but are not concerned with hearing.

"The inner ear has a dense bony wall forming an irregular cavity referred to as the bony labyrinth and is filled with fluid. It contains a smaller structure of the same general shape called the membranous labyrinth which contains a fluid that is separate and distinct from the rest of the fluid in the bony structure. Its walls are formed by a very soft membrane so that sound waves pass through them with little obstruction. The cavity of the inner ear is encased in solid bone and has only two small openings into the middle ear, one at the oval window into which fits the stirrup, and one at the round window indicated at 'r.' An elastic membrane is stretched across the round window and is sometimes referred to as the secondary ear drum. The middle ear is connected to the outside air by means of a small tube called the Eustachian tube, which opens into the upper part of the throat behind the nasal cavity.

"The inner ear consists of three principal parts, namely, (1) the semi-circular canals which take no part in the mechanism of hearing but serve as an organ of balance; (2) the vestibule, the space just behind the oval window, and (3) the cochlea which is really the end organ of hearing. Cross-sections of the cochlea as it twists into a relatively long spiral of two and three-quarter turns like a snail shell are indicated at 'S' in Fig. 1. The center of the spiral is a bone called the modiolus, and is perforated to allow space for the auditory nerve.

"The cochlea is divided along its length into three parts by the basilar membrane and Reissner's membrane. These form three parallel canals which are wound into the spiral.

"These canals, illustrated in Fig. 2, are called the scala media, or canal of the cochlea, the scala vestibuli and the scala tympani.

"The partition between the scala tympani and the other two chambers is composed of a bony projection called the lamina spiralis for about half the distance, the remainder being a flexible membrane called the basilar membrane. It is seen from this figure that if any vibratory energy is communicated from one side of this partition to the other, it must vibrate the basilar membrane. On one side of the basilar membrane is the organ of Corti, which contains the nerve terminals in the form of small hairs extending into the canal of the cochlea. Attached to the lamina spiralis and lying over the hair cells is another soft loose membrane called the tectorial membrane. The details of this part of the inner ear are made clearer by Fig. 3,

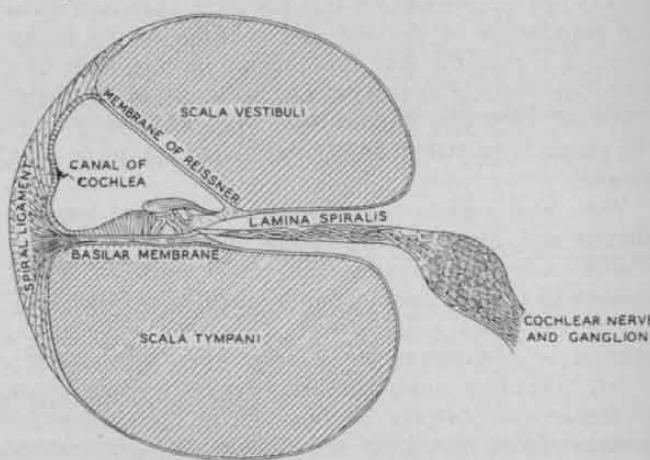


Fig. 2.

Cochlea in transverse section. Observe especially the canal of the Cochlea, which is a part of the membranous labyrinth. (Testut).

which is a greatly magnified cross-section of these two membranes. It is seen from this figure that there are five rows of hair cells at the terminals of the so-called rods. There are about five thousand rods in each of the four outer rows and about three thousand five hundred in the inner row, making a total of about twenty-three thousand five hundred rods. At the end of each rod there is a hair cell from which project twelve to fifteen hair cilia into the liquid of the cochlea. When a sound excites the sense of hearing there is relative motion between the basilar membrane and the tec-

torial membrane which causes the hair cells to stimulate the nerve endings at their base. The base of the inner rod of Corti is supported on the end of the bony projection, called the lamina spiralis."

Authorities disagree as to the exact kind of relative motion and the details of the way in which the nerve endings are stimulated, but it is agreed that nerve endings are stimulated when vibrations are conducted from the canal of the cochlea to the scala tympani.

"A nervous impulse is then conducted by means of nerve fibres through the base of the rods to the cochlear nerve and then to the brain, causing the sensation of hearing."

We are not particularly interested, in this study, in the details of hearing as related to pitch discrimination, etc., a discussion of which would take up many pages.

A number of investigations were carried on during the World War in an endeavor to determine the best means of protecting the ear against concussion. Perhaps the most elaborate of these investigations was conducted by Dr. Stacey R. Guild, at the University of Michigan.

Dr. Guild used guinea pigs as subjects and a .45 caliber Colt pistol (with ball ammunition) to produce the concussion.

He compared five commercial ear protectors, dry cotton, glycerine-soaked cotton, vaseline-soaked cotton and wax cones of the Italian Navy type.

The effects (as discovered by dissection) were compared and it was found that the "Tommy" protector gave the best protection to the middle ear, while glycerine-soaked cotton protected the inner ear better than any other device.

Certain mechanical experiments indicated that the force of the explosive wave in the unprotected ear was more than two hundred times greater than when protected by the "Tommy" or vaseline-soaked cotton.

Inner ear damage ranged from the loss of a single or a few adjacent outer hair cells to the complete destruction of the organ of Corti.

Dr. Guild and other writers have pointed out that no hard obturator should be used on account of the danger of aggravating the effect of what might otherwise be a superficial wound.

A very thorough study of the effect of explosions of different caliber antiaircraft guns on the hearing mechanism was made at Aberdeen, Maryland, by Major A. J. Vadala, M. C. U. S. A., in 1929.

Only those soldiers were examined and studied who actually participated in handling and firing the different guns. A total of seventy-five soldiers were examined before firing was begun and re-examined one week after completion of firing tests which occupied a period of approximately two months.

These cases are divided into:

1. Those who heard well previously and now show no change.

2. Those who heard well previously and now show defect.

3. Those who showed some defect before and now show defect aggravated.

The examinations included tests of hearing by watch tick and whispered voice, certain diagnostic functional tests and visual inspection of the external auditory canal and drum membrane. Unfortunately, no au-

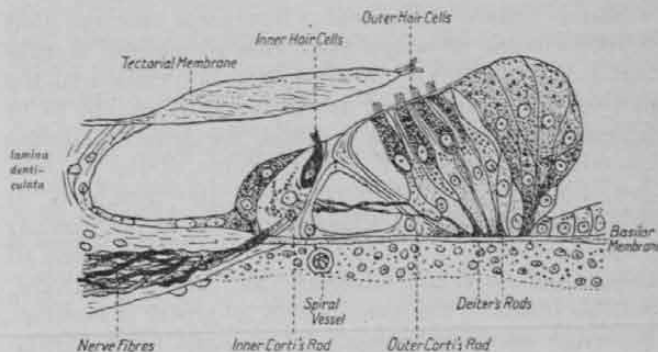


Fig. 3. Corti's Organ (after Retzius).

The tectorial membrane is shown contracted in the process of hardening the tissue, and torn away from the plateau of Corti.

diometer was available for making the functional examinations. Audiometric tests would have been particularly interesting since they would have shown with great accuracy the acuity of hearing before and after firing, at each of the following pitches: 64 cycles per second, 128, 256, 512, 1024, 2048, 4096, 8192. Such a study would show change in hearing acuity in greater detail and with greater accuracy than the ordinary tests.

An interesting audiometric study of the effect of flight on hearing† was made by the Naval Research Laboratories, Bellevue, Anacostia, D. C. Audiometric measurements of aviators' hearing were made before, during and after flight.

The sounds to which the fliers' ears were exposed were of a different character from concussion; the intensities were high but the sounds were continuous instead of intermittent. The tests showed a fatigue effect which lowered the threshold of acuity of the subjects for a period of several hours after flight.

This suggests that possibly part of the lowered acuity after exposure to repeated concussion may be due to fatigue.

In the tests at Aberdeen the types of guns used were 105-mm., three-inch, 37-mm. and one-half-inch machine guns and multiple mount machine guns.

Anticipating trouble from the previous year in which many cases of bleeding ears were reported from the firing of the three-inch guns, all gunners, irrespective of type of gun, were ordered to wear cotton plugs in their ears.

The report, therefore, shows the effect of concussion even though a protective measure was used.

In order to obtain personal information as to the effect of these guns, Major Vadala took all positions on the gun platforms and around the guns, thereby

* Scientific Ear Drum Protector, "Tommy," patented in Great Britain and France, 1915, and manufactured in London by Geo. F. Berry; consists of a hollow soft rubber, spherical bulb with an opening on one side, surrounded by a flange.

† "Effect of Flight on Hearing," C. B. Mirick; Proc. I. R. E., Vol. 17, No. 12, Dec. 1929.

acquainting himself with details which otherwise would escape notice, such as noting the effect of explosive blast, with its alternations of pressures above and below normal, on ear drums, nose, mouth and head.

When any trouble was experienced by the gunner, he was immediately given a functional test and visual examination by reflected light of the external auditory canal.

Major Vadala states that "Bourgeois observed that in those cases in which the drum membrane is ruptured, the injury of the perceptive labyrinth and the consequent deafness are less grave and less apt to be permanent than in cases in which the drum membrane remains intact, because the first force of the air condensation is expended in rupturing the drumhead. It is obvious that this structure cannot carry the hammer handle and with it the incus (anvil) and footplate of the stapes (stirrup) suddenly and forcibly inward, and the insult to the membranous labyrinth is lessened. We must hereafter regard the accident to the drumhead as an unfortunate accident, but, nevertheless, as the lesser of two evils."



THE 3-INCH A.A. GUN M3 ON MOBILE MOUNT M2.
The illustration shows the gun being emplaced by its crew. The perforations shown in the platform were introduced to lessen the effects of percussion on the ears.

In 1927 the solid gun platform of the three-inch A. A. gun seems to have acted as a reflector of the sound waves and aggravated the effects, for in 1929, with the perforated platform, the cases of bleeding ears which occurred before were eliminated. Even with the perforated platform much tubotympanic congestion was caused but it all cleared up after cessation of the firing, leaving no ill effects.

The 37-mm. A. A. gun seemed to cause more severe shock than the three-inch. This may be because of the sharpness and severity of the shock, combined with the rapidity of fire. The pressure seemed to be very much increased forward of a line drawn at right angles to the bore.

This was strikingly true of the machine guns, and Major Vadala states in connection with the multiple mount that "the effect is worse along side of the gun and very little back of the gun; in other words, the man firing the gun gets less effect than a bystander."

Of the seventy-five soldiers studied, nearly half showed various degrees of congestion, which later cleared up, leaving no permanent defects.

Major Vadala's report of the results says:

"Six cases, four among 37-mm. gunners and two and three-inch, developed hemorrhages of the drum membrane.

"Two of these had perforations and developed suppurative middle ears and hearing defects.

"Two developed perforations with no middle ear suppuration or hearing defects.

"Two entirely cleared up, leaving no marks and with complete return of hearing.

"Two cases with previous history of suppurative middle ear disease developed a recurrence of suppuration. It would seem that cases of perforation of ear drum should be disqualifying for gunners."

From the above summary it seems that the effect of the 37-mm. on the ears is slightly more serious than the three-inch guns. The explosive blast seems shorter but more intense than the three-inch and its rapidity of fire has a cumulative effect with bad result.

No cases of concussion deafness were noted.

As a remote effect on hearing, it seems that the long continued and oft repeated tubotympanic congestion resulting from gunfire has a gradual diminishing effect on the acuteness of hearing.

As a result of this study Major Vadala suggests a protective device to be made of sponge rubber, the body of which fits snugly in the shell of the ear, and having a projecting teat fitting snugly into the opening of the canal.

The porous rubber, by its multiplicity of holes, not only dissipates the sound waves but allows the individual to adjust it firmly without injury to the epidermis of the canal, thus avoiding infection. It insures uniformity of application. Again, by fitting snugly to mouth of canal and not in it, it also prevents plugging of wax in canal and injury to canal tissues which would otherwise be painful. This device can be easily adjusted by cutting to fit any ear. It will take care of any concussion sounds from the 105 to three-inch.

For the 37-mm. and machine guns, whose shocks are small, intense and repeated, a head piece like a radio head set with two rubber pads fitting snugly against the ears (after the porous rubber ear piece is inserted) will make of the skull a solid surface and prevent the gunner from receiving the cumulative effect of repeated sound wave.

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Reviewed by Major Alexander L. P. Johnson, Infantry

COLOMBIA—*Revista Militar del Ejercito*—January-February, 1932.

In honor of the Bicentennial of the birth of George Washington the *Revista Militar del Ejercito* of Colombia dedicates the opening pages of this issue to the Father of Our Country whose likeness adorns this ably edited military periodical as a frontispiece. The editors reproduce on this occasion the correspondence that passed between the great Liberator, Simón Bolívar, George Washington, P. Custis, Lafayette and others regarding the George Washington portrait and relic presented by the Washington family, in 1825, to General Bolívar through Lafayette. A thumbnail sketch of the life of Washington appropriately completes the tribute of our comrades in arms of the Colombian Republic. May the ideals and precepts of Bolívar and Washington ever cement the friendship that happily prevails between the nations which owe their existence to the genius of these great Liberators of the North and South.

CANADA—*Canadian Defense Quarterly*—April, 1932. "An Unsubstantial Frontier of Europe," by An Observer.

"One of the many territorial problems," writes the author, "which had to be dealt with by the Allied Powers at the close of the Great War was that of the frontier between the resurrected countries of Poland and Lithuania." That frontier, fourteen years after, is still one of the unsettled and constantly irritating problems of Europe. For several centuries the two countries were more or less united. Although the golden age of Poland coincides with the reign of the Jagellones, her Lithuanian dynasty, it was Polish culture that bid fair to cement the two nations firmly together. The partition of Poland interrupted this peaceful evolution. With the collapse of Russia and Germany, Poland and Lithuania came back into existence as independent but separate states. There was keen controversy as to the national frontier. In the disputed areas the populations were thoroughly mixed. The main area in dispute was the district of Vilna including the city of Vilna claimed by the Lithuanians as their national capital. The League of Nations awarded the district to Lithuania. A Polish general—ostensibly disowned by the Polish government—seized Vilna by force and defied Lithuania and the League of Nations to dislodge him. The League of Nations, following the advice of the Council of Ambassadors, reversed its decision and awarded the district to Poland. Lithuania broke off relations with her neighbor and refused to recognize the League's decision. Along the frontier which now separates these nations, Poland maintains a chain of guardhouses placed at intervals from 6 to 10 km and Polish frontier guards keep a vigilant watch over Lithuanian

approaches. The Lithuanians, on the other hand, with significant consistency refuse to establish any sort of guardhouses or watch towers along a frontier which they decline to recognize. As might be expected, frontier clashes between sentries of the two states are rather of common occurrence. On dark, stormy nights Lithuanian patrols have a trick of moving frontier markers farther back into Polish territory. The Poles of course move them back as soon as they detect the trick, perhaps adding here and there a few yards to their territory. There are neither roads nor railroads across this troubled frontier.

Although Lithuania alone cannot hope to do anything to change the situation, serious danger lurks in the circumstance that behind Lithuania are Germany and Russia, neither of whom is likely to remain satisfied with the present territorial arrangements. Whenever either of them regards the time ripe for action, the Lithuanian frontier with its constantly recurring incidents and atmosphere of permanent friction may offer a convenient place for the striking of the spark which will set the powder magazine ablaze.

AUSTRIA—*Militärwissenschaftliche Mitteilungen*—January-February, 1932.

"Did Armaments Cause the World War?", by Major General Franz Schubert.

"The members of the League of Nations subscribe to the principle that the preservation of the peace demands the reduction of armaments," thus quotes the author from an official pronouncement of the League. The author goes on to show that in 1912, France appropriated for her military and naval establishments about 30, Germany 23 and Austria-Hungary 10½ gold crowns per capita of population. The gold crown was worth about 23 cents, U. S. currency. In 1913, the author states, there were with the colors in France one soldier for every 65 inhabitants. The ratio in Germany was one for every 98 and in Austria-Hungary one for every 128. At the outbreak of the war France mobilized 8 per cent of her population, Germany 5½ per cent and Austria-Hungary only 2¾ per cent. Thus, the author observes, "if armaments were actually responsible for bringing on the World War, the blame certainly cannot rest with the Central Powers. Notwithstanding these facts, the author continues, the Central Powers were charged with war guilt and were as a punishment disarmed, while France and her allies continued to arm to a point where their present armament far exceeds that of the pre-war period.

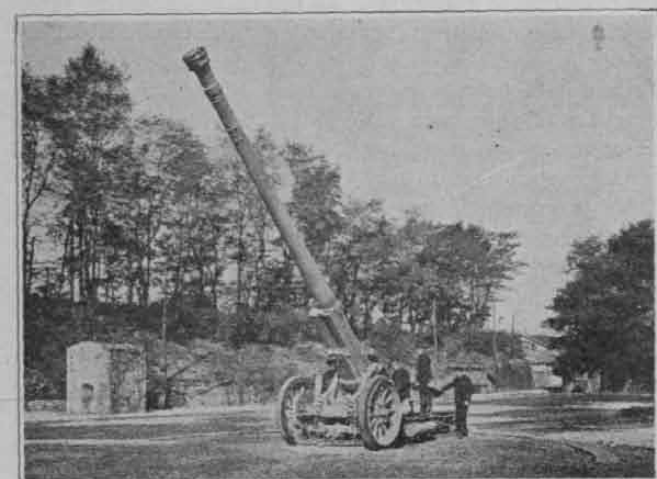
The author does not answer the query he chose as a title for his thesis, except by implication, that the armaments of the Entente, notably of France rather than those of the Central Powers brought on the war. The arguments advanced are not convincing

for, unfortunately, statistical figures can be used to prove anything.

FRANCE—*Revue d'Artillerie*—February, 1932.

"The 155 mm Schneider Gun."

The new platform mounted 155 mm Schneider gun with an all-around field of fire is characterized by its ease of manoeuvre, rapidity of fire and great mobility. These qualities are essential considering that this gun



The 155 mm Schneider Gun in Firing Position.

is intended for use against aerial as well as ground targets. The gun, set at an angle of 45 degrees, will fire a 50 kilogram projectile a distance of 26 kilometers with an initial velocity of 900 meters. Mounted upon a platform with a semi-circular track, the gun is capable of firing in any direction at elevations from -8 to +45 degrees. The breechblock is easily operated at any angle of elevation. The rate of fire is four to five rounds per minute at angles of elevation between zero and 25 degrees, and three to four rounds per minute at elevations above 25 degrees.

The gun is normally transported in three loads, the gun, the carriage and the platform. It can be transported in a single load. The gun can be put into action in a very short space of time without the necessity of excavation. The projectile, weighing 50 kilograms, contains 5.580 kg of explosives. The powder charge weighs 19.500 kg. The maximum range is 26 kilometers. The field of fire is 160 degrees which by a simple shifting of the semi-circular track is increased to 360 degrees.

The gun in battery, including platform and track, weighs 16,400 kg.

—*Revue Militaire Francaise*—February, 1932.

"Yorktown (1781)," by General de Cugnac.

The Sesqui-Centennial of Cornwallis' surrender at Yorktown, at the commemoration of which, in October, 1931, Marshall Pétain participated as the official representative of France, furnished the motive for General de Cugnac's very interesting and able monograph of that memorable campaign. "This short and brilliant campaign," writes the distinguished author, "is largely ignored by the French public. It well deserves to be known. Remarkable for its strategic conception and for the perfect cooperation between the land and

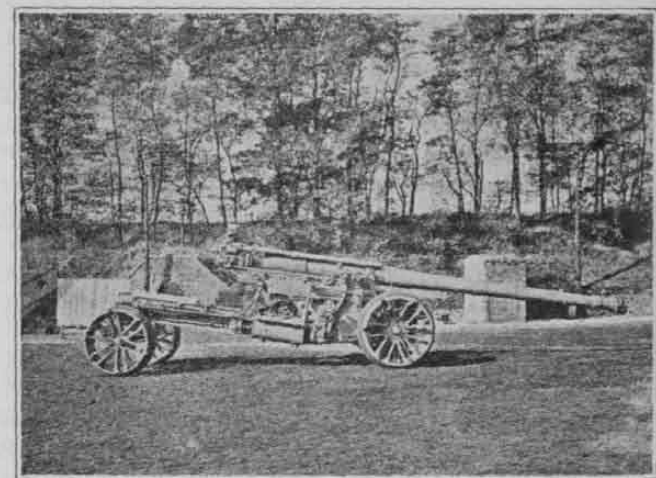
sea forces, it was a small affair from the point of view of actual numbers involved, but most important from the point of view of actual results. The Franco-American victory at Yorktown assured the independence of the United States, changed the map of the world, and for these reasons is the greatest event in modern history."

Tracing in detail the events of that truly remarkable campaign on land and sea, which, after three months, culminated in the capitulation of the British at Yorktown, the author concludes that it is difficult to find in history another campaign as perfectly conducted. "Everything merits admiration; the perfect collaboration of France and America, as well as the excellent relations which existed between the allied general staffs; the correct strategic plans; perfect tactical disposition of troops and naval forces; the skill of the artillery on land and sea; the valor and endurance of French sailors, and both French and American troops." The most important factor, however, which made that victory possible was, the author points out, the mastery of the sea which de Grasse was able to secure. "The arrival of the allied siege artillery, the transport of infantry, the naval blockade and the inability of the British to bring up reinforcements, were all corollaries of French naval superiority."

GREAT BRITAIN—*The Army Quarterly*—January, 1932.

"Yorktown, 1781," by Captain M. E. S. Laws, M.C., R.A.

"At the present time, when popular clamor for disarmament may be expected to sway the judgment of



The 155 mm Schneider Gun, Traveling Position.

those who are responsible for the efficient maintenance of the country's fighting services," writes the author, "the unveiling of a tablet at Yorktown, Virginia, to commemorate the surrender of Lord Cornwallis' army to George Washington... teaches a lesson which we cannot afford to forget, namely our dependence on sea-power in war." The author believes, that the capitulation which lost the American colonies to England was the direct result of the temporary failure to retain command of the sea. He points out, that

after five years of war the situation was by no means unsatisfactory for England. The colonists, in spite of French aid, were disorganized and their enthusiasm for the war was on the wane. The British troops were, however, numerically weak and their operations were, in the author's opinion, hampered by friction between their commanders. Giving a brief outline of the progress of the campaign which ended with the surrender of the British at Yorktown, the author concludes that "the campaign had been badly mismanaged partly owing to personal jealousies between Clinton, Cornwallis and Germaine, the Secretary of State in London, and partly owing to ineffective cooperation between the naval and military commanders, but the immediate cause of the disaster was the unexpected arrival of de Grasse in overwhelming strength which gave to the enemy command of the sea." He believes, that without the assistance of the French fleet, Yorktown could not have been completely invested, and the British army could have been transferred either to Charleston or to New York.

The loss of the command of the sea by the British for a period of six weeks was, in the author's opinion, sufficient to finish at a blow the war, which had dragged on for six years. "The vital necessity for England to retain command of the sea in war," writes the author, "is so obvious, that the lesson of the Yorktown campaign must not be overlooked when the time comes to discuss further reductions in naval armaments." One cannot help to agree with the author when he concludes that "the cost of a powerful navy may be heavy to a nation already embarrassed by financial difficulties, but the inevitable penalty of weakness at sea will certainly be no less disastrous in the future than it was...at Yorktown."

GERMANY—*Militär-Wochenblatt*—January 11, 1932.

"The Last 200 Meters," by Lieut. Col. Dr. Lothar Rendulic.

The difficulties involved in delivering a daylight attack under modern conditions of warfare will necessarily compel the attacker to launch his offensive as far as practicable under cover of darkness or to take advantage of poor visibility, natural or artificial. Even under the most favorable conditions the attacker will have to be content if he can come within 200 meters of the hostile main line of resistance. Whatever the time or conditions of the attack, the moment the infantry assault waves arrive within 200 meters of the enemy's line, supporting artillery fires must necessarily cease. During the most critical stage of the attack, the final assault, the attacking infantry is thrown completely upon its own resources.

In the light of war experiences, infantry on the defensive can recover its striking power quickly after the hostile artillery lifts its fire. The last 200 meters present a formidable problem to the attacker. The author seeks the solution in a proper employment of infantry weapons. Among these, he believes, the heavy machine gun is the most important. It should give uninterrupted support to the advancing skirmish line under all circumstances but more particularly so during the last 200 meters. This will frequently necessi-

tate the emplacement of heavy machine guns far to the front. The light machine gun plays an equally important part in the tactics of the final assault. The infantry mortar as the battalion commander's weapon should be used in advanced positions only under favorable conditions. The author observes that there is a growing demand for a light type mortar in the rifle company. These mortars would go into action within the combat zone of the rifle company. In the case of light mortars single bursts are more important than effective range, hence reduction of weight must not be sought by means of reducing the calibre. Moreover, a single calibre for both types of weapons would considerably simplify the ammunition supply. The author believes that the mortar is an indispensable weapon in that stage of the attack when the infantry no longer can receive the support of artillery.

Another very effective but somewhat neglected weapon is, in the author's opinion, the rifle grenade. It has, however, the serious drawback that only a small proportion of riflemen can be equipped with the rifle grenade, hence it is always a question whether or not the men so equipped will actually reach the point whence they may fire with the maximum effect. It would be difficult indeed to hold out initially rifle grenadiers with a view of bringing them forward at the critical time and place.

Different armies conceive differently the tactics of the final phase of the attack which begins approximately 200 meters from the enemy's line. The French favor a coordinated attack behind a rolling barrage. The line of departure may thus be several hundreds of meters from the enemy. The infantry advances to its objective without halt. Platoons and squads drive home the assault independently. The charging distance is about 10 meters. This plan of action, in the author's opinion, represents a purely infantry point of view. It fails to utilize fully the fire power of the artillery and of the heavy infantry weapons. In marked contrast to the French plan of action, Austrian combat regulations provide for heavy artillery concentrations either upon request of the infantry commander or upon the initiative of the artillery commander. The infantry must be in position to deliver the assault the moment the artillery lifts its fire. During the charge infantry weapons, notably hand-grenades supply the necessary support to pin down the enemy. The Austrian plan of action does not admit a rigidly meticulous organization of the attack except in zone warfare. The impulse to the charge germinates in the most advanced line. The artillery must keep itself thoroughly informed as to the progress of the attack and render the necessary support. Coordination is largely left to the respective commanders of the infantry-artillery team.

Tanks and attack aviation, in the author's opinion, will necessarily support the main effort. Their employment requires elaborate preparation, hence their usefulness, the author thinks, is largely restricted to position warfare.

Within the enemy's lines the action becomes a series of isolated combats of small groups. Control by the

higher echelons of necessity must give way to the initiative of subordinate leaders. A prearranged plan of coordination of supporting weapons is practically out of the question. In this situation infantry must be wholly independent of the artillery, hence heavy machine guns in close support assume particular importance.

The advance over the last 200 meters and the ensuing combat within the hostile position represent the decisive phase of the attack. They present such a variety of situations that, in the author's opinion, it is quite futile to lay down rules to cover all possible contingencies. It is, therefore, important that the peace-time training of leaders and troops take full cognizance of this fact, and provide the practical means of inculcating initiative and resourcefulness in subordinate leaders in order to enable them to meet situations effectively and efficiently as they arise.

—*Wissen und Wehr*—April, 1923.

“The Concentration of the Cavalry,” by Konrad Leppa.

An interesting study and discussion of the strategic concentration and employment of cavalry by the various belligerents during the early stages of the World War. The author, a general staff officer with the Austro-Hungarian First Army during the war and a noted writer on military subjects, reaches the conclusion, that nowhere was the employment of the cavalry correctly conceived either strategically or tactically. In the West as well as in the East, cavalry divisions rode practically side by side, but there was never an attempt to assemble under a single leader a cavalry force of several divisions for the purpose of seeking a decision. The great lessons of the campaigns of Napoleon and Frederick the Great seem to have been forgotten. Both of these great generals consistently used the cavalry in large bodies. The high commands and general staffs of the World War apparently did not think in terms larger than the division. Russia, France and Austria-Hungary, according to the author, even neglected to create the necessary cadres for the command and general staff of cavalry corps. No thought was apparently given to the possibility that such large bodies of cavalry might be en-

trusted with important missions during the period of concentration. The consequence of the erroneous views which prevailed regarding the employment of cavalry, the author believes, was its faulty concentration, and this inevitably led to a gradual dissipation of that arm during the progress of the war. “It is not easy to lead cavalry,” writes the author. “The best cavalry can prove its worth and mettle only when led by a great cavalry leader. Great generals are born and not appointed. This applies with equal if not greater force to cavalry generals.”

HUNGARY—*Magyar Katonai Szemle*—June, 1932.

“French or Italian Orientation,” by Ladislas Nyiri.

The author discusses Hungary's foreign policy as to whether it ought to follow a French or Italian orientation. Although, in the author's opinion, the peace treaties which terminated the Great War bear the stamp of French imperialism, the treaty of Trianon would not have been as severe had it not been for France's bitter hostility towards Germany. The German people, he states, were misled at the peace conference by assurances to the effect that Germany's disarmament was not a punishment but merely a prelude to universal disarmament. He presents graphically the European armament situation as shown below.

A glance at the map of post-war Europe shows that Germany is encircled by the armies of France, Belgium, Czechoslovakia and Poland aggregating nine million men. France, reenforced by the states of the Little Entente and Poland succeeded in securing the balance of power against the Anglo-Italian-German group. The author raises the serious question, whether or not France might in time be tempted to pursue a policy which is bound to lead to war.

The author believes that Germany will not consent to perpetual isolation. It is natural that she should turn towards Russia for assistance. Although much is said about the Red Army one way and the other, it is certain that Soviet Russia possesses an excellently equipped military establishment which as far back as 1920 was able to overpower the Poles. In order to counter the Russo-German menace, France sponsored the Polish-Rumanian military accord which places the combined forces of those nations under Marshal Pil-

U.S.S.R. 6,500,000

FRANCE 4,500,000

POLAND 3,200,000

RUMANIA 2,000,000

CZECHOSLOVAKIA 1,300,000

YUGOSLAVIA 1,150,000

BELGIUM 600,000

GERMANY 100,000

European Armament Situation



Post-War Europe

sudski's command in the case of a war. If however, the Polish-Rumanian army of five million men facing Russia's six and a half million were attacked in the rear, conceivably their front might collapse. Thus, the creation of a second strategic grouping becomes a necessity. In this connection Czechoslovakia, Hungary and Yugoslavia might come into consideration. So far, Hungary has been left out of all reckoning partly because of the disinclination of France and her allies to grant Hungary any concessions, and partly, because Hungary in her present mutilated condition would be of little value to France. Hence, Czechoslovakia and Yugoslavia may be regarded as France's strategic reserves. Czechoslovakia is in a particularly favorable position to menace Berlin. The author concludes, that Poland, Rumania, Czechoslovakia and Yugoslavia are important bulwarks of French capitalism against any possible soviet assault and at the same time are valuable supports in any anti-German action. Thus, France's vital interests demand the preservation of these states, and it follows, that any revision of the treaty of Trianon in favor of Hungary is contrary to the interests of France.

On the other hand, Italy's renunciation of the eastern shore of the Adriatic in favor of Yugoslavia was a genuine sacrifice, the author believes, for as long as another flag flies on that sea, Italy's eastern coast must be provided with adequate defenses. It is one of the motives behind the Italian policy of expansion eastwards, which quite conceivably may lead to a conflict with Yugoslavia. Although Italy's army is numerically superior to that of Yugoslavia, the narrow frontier, which separates the two kingdoms, is ill-adapted to elaborate military operations. It is for this reason that Italy has a peculiar interest in Albania. An invasion of Yugoslavian territory across the Albanian frontier would, however, likewise prove difficult, the author believes, unless Italy is able to secure certain strategic points in Albania before the outbreak of hostilities. Necessarily Italy must pursue a foreign policy which will be helpful to her in her quest for the mastery over the Adriatic. Hungary, by her geographic position, might seriously menace Yugoslavia, but only if Hungary could recover her former strength. It follows, the author concludes, that it is in the interest of Italy that Hungary should recover her former frontiers. On the other hand, the author adds, the best interests of Yugoslavia dictate that she secure Hungary's benevolent neutrality by offering some territorial concessions.

JAPAN—*Kaikosha* (the Army Club's monthly). Extracts from translation in *Japan Advertiser* of Tokio.

When the Imperial Forefather, Jinmu Tenno, completed the work of foundation of the Empire, he established his palace at Kashiwara, Yamato Province, and there enshrined the Gods of Heaven and Earth. He declared his intentions and prayed for the well-being of his people, thus firmly founding his State.

When we think of the history of the three thousand years since the foundation of the Empire, our hearts are filled with a sense of awe and pride. Especially

are we elated when we think of the late Meiji Tenno, who showed by his own example the will and power which should guide the Empire throughout all ages, in whose reign the Japanese nation brilliantly showed the life-energy which had for some time been dormant. Now Imperial Japan has made a place of her own, unassailable like the august figure of Mount Fuji itself, soaring, severe and resplendent. Mount Fuji is the very symbol of the Empire of Japan. When we contemplate the august shape of Mt Fuji and compare it with the true racial spirit of the Japanese a profound sense of elation and pride rises in our breasts and strengthens our courage.

Rise of Frivolous Thought.

It is a matter of great regret that recently there has been a rise of frivolous thinking among the Japanese through the influence of foreign thought. People seek momentary enjoyment only to end in a grievous loss of the sturdy spirit of seriousness and daring. Needless to say, this tendency toward frivolity is due to ignorance and lack of consideration, yet it is a cumbersome growth comparable to the brambles that infest one's path. The enlightened elements can no more forebear speaking out, though this frivolous element is a minority. We never entertain doubt as to the glorious history of the three thousand years which is ours, and believe in its ultimate influence even upon our young men, yet we should at the same time be prepared to do our best anticipating the worst.

By expressing himself here concerning the mission of us Japanese in these early years of the Showa Era, the writer does not mean to warn or teach the world, but he means to warn himself by deliberating on the subject.

Buddhist scholars preach non-discrimination among men. They claim that the world of truth lies in non-discrimination of everything animate or inanimate. This is true enough so long as they mean by the world of truth the world of nothing. There can be no discrimination in a world of void. However, is a world of void the world of truth? In a world of limitations there cannot be non-discrimination, and we cannot but differ from the Buddhists in the conception of the actual world in which we live.

Everyone Has a Mission.

Everything that exists in the universe has its own mission. The sun, the moon, the earth and the myriad stars. They all may be said to be destined to fulfill their mission. In the world of humans or animals, men are gifted with natural attributes, while cows, horses, dogs and cats, even birds and insects, and trees and the grass, have their respective destiny to fulfill. They are differentiated, and there can be non-discrimination between them. In their very differences lie the value and significance of their respective lives. Pekinese dogs are for petting, and pointers are fit for hunting.

Differences in nationality, territory and race characterize races of men on earth. Each race has its own significance. The Japanese have their own destiny to fulfill, while the Chinese have their own char-

acteristics and qualities. The same may be said of other peoples on earth. The world will have its prosperity and well-being only when all people strive to know and polish their gifts from Heaven as a race or a nation. It is the duty of the Japanese as well as of other nations to realize their natural destiny and coordinate their activities accordingly. The idea of non-discrimination is not a philosophy likely to be accepted. The present writer is convinced that in a very thorough discrimination lies the salvation of men, identifiable with the paradise dreamed of by the Buddhists as attainable through the principle of non-discrimination.

In the world there is still going on a struggle between the strong and the weak, and in the economic world the storm of depression is raging and working havoc with the finances of various nations and enterprises, while within, the imported idea of utilitarianism is misguiding people's lives into egoistic enjoyment only to cause social unrest in manifold ways, throwing their lives into tortured paths of unnatural and arbitrary elevation. We indeed face an abnormal difficult situation to deal with.

Courage is Needed.

There is no doubt that much courage is needed to deal satisfactorily with the present situation, but courage alone will not do. Thorough recognition of facts is another important fact that must precede decisive measures. And recognition of things around us must proceed from recognition of self, without which one cannot be qualified to deal with objective situations.

Recognition of self is the first thing that must be realized, for without it you cannot find means to cope with the situation with which you are confronted. In order to deal with the present difficult situation, we must start with the consciousness that we are Japanese and no other. This consciousness is the measure by which all must be gauged.

In the case of the Manchurian problem, we must see what is the true cause that led to the present entanglements. Every Japanese ought to know, and in fact every one does know, that illegal violation of international commitments by the Chinese, violation of international custom laws and infringements of Japan's already acquired rights have led to the present situation in Manchuria. This is too true. Yet to be frank, there is a more fundamental problem at the root of the whole trouble. I mean the disrespect for the Japanese by the Chinese. It is no exaggeration to declare that not alone the Chinese, but many nations, look down upon the Japanese today because the Japanese are showing symptoms of mental breakdown. You will at once realize it when you think of the Chinese attitude toward Japan just before the outbreak of the armed conflict in Manchuria and the attitude which the League of Nations has adopted in its interference with the Manchurian dispute.

Chinese Attitude Toward Japan.

Japan's acquired rights were violated everywhere in China. Even in the text-books of Chinese primary schools reading matter were inserted calculated to

poison the mentality of the youth against Japan and the Japanese. When Japan at last discarded her long-suffering patience, justice was with her. The Gods in Heaven and on Earth bear witness to Japan's just claim. Yet the League of Nations, which ought to have acted strictly in the cause of universal justice, dared to refuse to recognize the rightful claim of Japan, and for a long time there was every danger of its going on in the wrong path in spite of Japan. This clearly shows how disparagingly Japan is held in the view of the whole world.

The reason why things have come to this pass may be explained in a nutshell—it is because the Japanese themselves have forsaken their pride, faith and self-consciousness; it is because the Japanese have immersed themselves in the bad habits of frivolousness of thought and life, degrading themselves in their own eyes. It is therefore of vital importance that the Japanese again should refresh their consciousness in the glory of their national life, discarding their frivolous ways of thinking and living before they can impress upon the world their importance as a nation and have the Manchurian problem solved satisfactorily.

Even after Japan has gained world recognition of the world for her special interests in Manchuria and Mongolia, there is much ground for doubt as to whether the Japanese will be able to maintain what they have gained. Nothing far-reaching can be gained if they are so shallow in their planning as to be satisfied with making new colonial and economic regions of Manchuria and Mongolia, for it is undeniable that the Japanese are at disadvantage in economic and laboring life as compared with the Chinese. Big commercial concerns, even in Dairen, are controlled by Chinese merchants who are gradually replacing the Japanese. Even such purely Japanese trade as mat-making or bean growing is being taken over by the Chinese, which clearly indicates the inferior position of the Japanese in face of Chinese competitors. Such a situation is not alone seen in Manchuria; the same thing has been taking place in Formosa.

The Spirit of Japan.

In contemplation of the spirit of the Japanese nation, we should not lose sight of the bigger objective, of what we call our continental policy. We should not make it the ultimate object of our continental policy to seek selfish gains alone.

The secret of winning a victory is in knowing one's own strength as well as one's limitations. This is applicable to every activity of man. The only way by which the Japanese can tide over the present difficulties lies in knowing themselves first and foremost. Only when the Japanese have realized that they are Japanese first and last will it be possible for them to achieve any marked progress in their national destiny.

The way which the nation must follow has been marked out by our Imperial Forefathers. We are only required to follow the path which the Emperors Themselves have followed. The Japanese need not search the path of life; they have merely to follow

what our Imperial Forefathers have marked out for us and to follow, for there is no change in the direction in which the Japanese have to pursue their national development. To safeguard the Imperial Destiny; this is the mission for which we are given to life in this land of glory. All of us must coordinate our actions to this single purpose, and there should be no mistake.

We need not go far back into history to see how this great ideal of ours has been expressed outside of the Empire. The Sino-Japanese War of 1894-95, the Russo-Japanese war of 1904-05 and the German-Japanese War of 1914-1917 were all conducted as a means of contributing to the great national development. It is not strange that Japan's decision always had the approval of the Powers of the world, because none of them was ever assailed by Japan for egotistic motives or for mere territorial ambitions. It is the pride of the Japanese that their country never has engaged in an external war for egotistic motives. The Japanese never have permitted vice and injustice to go on with impunity. Japan has never erred in this respect, and this is why the nations of the world have always supported her cause. Japanese should never forget this fact.

Socialist Theories Deprecated.

It is a matter of regret that there are today, although only a limited number, some Japanese who have been inordinately influenced by Marxism and other social theories which give a materialistic interpretation to social development, or forget the national mission with which they are born into this world. These people wrongly believe that humans are just so many soulless machines incapable of appreciating ideals or without will-power or coordination in their lives for some higher sublimated objective in life.

This all too materialistic conception of life has driven many people to a frivolous way of thinking and manner of life. Capitalists seem to make it their only objective to profit at the expense of other elements of society; politicians are too much taken up by mere politics, concentrating their valuable energies for the promotion of the interests of political factions to which they belong; salaried men and students, too, are in grave danger of forgetting their real duties as members of the Glorious Empire. They have forgotten the ideals which inspired our fathers and grandfathers. They do not care to find their own ideals nor do they pay any thought to the future. Who could remain unconcerned about the future of the Empire when he thinks of these misguided people who constitute the backbone of the nation today? It is not the problem of tomorrow; it is the problem now confronting us, awaiting a far-reaching solution.

Japan is Isolated.

Among other things, we should realize the sorrowful fact that while we have not paid any attention to it, Japan has become isolated in the society of nations. While the whole nation was seeking their own immediate interests, the international position of the Empire has become a lonely one, without a friend to rely upon in these times of need. This happened

simply because the Japanese, forgetting their own destiny, have made themselves a nation which cannot be depended upon, chiefly through their mental disintegration. They have forgotten the spirit which made possible the glorious foundation of the Empire three thousand years ago, and in consequence have done away with their peculiar pride as a nation. By despising themselves, the Japanese have called upon themselves the contempt of other nations. You can see this in the example of China's attitude toward us as a nation. It is no idle allegation of mine to say that through forgetting their pride, the Japanese have called down upon themselves the disastrous situation in Manchuria and Mongolia. China's insult to the Japanese and the attitude of the League of Nations and some other Powers toward Japan have been made possible because of the self-depreciation of the Japanese.

The Imperial Principle of the Japanese Nation, which is the aggregate of the true spirit underlying the very foundation of the State and the national ideal of the Japanese, is, by its nature, a thing that must be propagated over the seven seas and extended over the five continents. Anything that may hinder its progress must be done away with even by the use of force. In this connection it would be well to review here the present situation in Eastern Asia, for the practical measures that we would consider adopting at any time must be based on the actual conditions surrounding us.

In China, which is our closest geographical neighbor, internecine strife has been going on for the past two decades. China has not got even a unified government machinery of its own; it does not have the framework of an independent state. India is under the rule of Great Britain, and its 300,000,000 population is suffering much. A serious crisis awaits its future. Central Asia and Siberia have already been placed in the grip of the talons of an eagle, you cannot there see a fragment of peace today. Mongolia, too, that land of peaceful life, has been allowed to follow the example of Central Asia. Besides the Empire of Japan, the only independent state in Asia worthy of the name is the Kingdom of Siam, but even this country is under constant menace from all sides and is having difficulties in extending its national power.

Japanese Must be Active.

Placed as we are in such surroundings, we of the Empire of Japan should no longer let things drift as they list. We of the Japanese nation, which is recognized as the leading Asiatic power both by themselves and by others should take the whole situation into our own hands. We must be active, even expending the last portion of our national strength. Mencius has said, "If we cannot secure both, let us prefer justice to life." Under whatever circumstances, we must be prepared at all times to make a desperate struggle, devoting ourselves to our single faith.

Great Britain is often called the nation of gentlemen. And yet the self-government movement in India

is gaining impetus year after year. How can you explain it? The United States of America loudly professes to champion righteousness and humanity, and yet what can you think of it when you review its foreign policy towards Panama, Nicaragua, Cuba, Mexico and other Central and South American nations. No where in the society of nations can we find that pacific spirit which we call by the name of the Imperial Principle of the Japanese Empire. This is very much to be regretted for humanity as a whole.

The countries of Eastern Asia are made objects of oppression by the white peoples. This is an undeniable fact and Imperial Japan no longer should let their impudence go unpunished. It is the duty of the people of the Imperial Japan to oppose each and every action by the Powers which is not in sympathy with the spirit of the Imperial Principle of the Empire of Japan which is an embodiment of justice and righteousness. It is natural then that Japan cannot close her eyes to any disturbance breaking out in any part of Eastern Asia, for destruction of peace cannot be permitted to exist side by side with the fundamental spirit and substance of the Imperial Principle of the Empire of Japan. It is therefore expected of every Japanese that he be ready both spiritually and materially to take his part in the duty of restoring peace even through resort to arms. If we were really determined to such an extent, it is needless to say that peace could be secured without our being called upon to draw our swords. It should be remembered always that determination does much.

Japan Misunderstood.

Unfortunately China does not yet understand the true spirit and strength of Japan; it commits the mistake of depending on European and American Powers, true to its time-honored strategem of suppressing barbarians with barbarians and the ill-conceived philosophy of befriending far countries in order to protect herself from her closest neighbors. By these wrong strategems China is bringing upon herself much misery.

To look upon Japan as a nation of warlike people is an ill-natured misunderstanding and a superficial observation. Japan has her native ideal—an ideal for the realization of eternal peace. Japan strives for nothing else. The sacrifice she is making in Manchuria is a good example; she has drawn her sword only to punish the monstrous being which is the object of hate from every point of view.

No elaborate discussion is needed here to stress how important the problems relating to Manchuria and Mongolia are, for they have already been exhaustively dealt with by all sorts of men since the outbreak of the armed clashes in Manchuria last fall. The present writer would like only to mention that Manchuria and Mongolia form a gate for Japan's propagation of its fundamental principle. The Japanese are historically bound up with Manchuria and Mongolia; economically these regions are inseparable from Japan, and from the point of view of population, we might mention that there we have our brothers and sisters

numbering as many as one million, including 800,000 Koreans. The natural resources of the region are most vital for the existence of the Japanese nation. They are also important as grounds for industrial exploitation. From the point of view of the national defence of Japan, too, these regions are of momentous importance to Japan.

However, all these considerations are merely secondary in importance. We should not forget that all of our national activities must be co-ordinated and guided by the spirit of the foundation of the Japanese Empire. It is a matter of vital urgency that the Japanese should establish their prestige in Manchuria and Mongolia firmly and eternally, otherwise they may forever be deprived of an opportunity to extend and propagate the national spirit of the Empire, while peace in the Far East may be disturbed so that the very existence of Japan is threatened.

Japan should not be content with the preservation of peace for herself alone; peace must be extended over Asia, and further over the whole world. This great ideal was proclaimed when Jimmu Tenno established his Imperial palace at Kashiwara, Yamato Province. It has been the guiding principle of the rulers of the Empire of Japan and all have been co-ordinated to it at every epoch in Japanese history. All the people co-operated to support the Imperial ideal.

The Problem of Eastern Asia.

The present situation in Eastern Asia calls for our action. The Manchurian campaign is most significant when it is interpreted from this point of view. Japan has taken the first step. Where Japan's real strength is felt, there is peace and order. The Imperial Army is not overfond of resort to actual use of arms, but it does not flinch from it when it is required for the maintenance or acquirement of peace and order. The Imperial Army is always aware that, when driven to it, a show of real strength is the best means of winning peace and justice, and it knows where to stop.

What is Mongolia today? Is it Chinese, or does it belong to Soviet Russia? Or is it an independent state? These are questions hard to answer definitely. China herself cannot answer them. If we discuss peace in Eastern Asia, we should first of all get a clear idea as to what Mongolia really is.

Japan naturally deplores the existence of a large tract of wild land, such as Mongolia, bordering on a region in which she has vital interests. She would like to have a Mongolia of the Orientals with peace and security guaranteed forever. It is out of the question that she should permit it to be invaded by a foreign power. There is every possibility that Mongolia may prove a greater barrier in the way of Japan's mission of peace and order than Manchuria has (ever) been. It is no idle boast to declare herewith that if there is anything that would dare obstruct the way for the propagation of Japan's mission of peace, the Japanese would be ready, in spirit at least, to make away with it. When we look toward Soviet Russia with the same attitude as we assume toward

Manchuria and Mongolia and take account of its activities in the Far East, we cannot ignore the fact that the word "Vladivostok" means "conquest of the Far East," and the name exists today.

For the maintenance of peace in the Orient, which is the very fundamental ideal of the Empire of Japan, the Japanese have many a time engaged in foreign wars and otherwise showed their determination, even at the risk of their national existence. Maintenance of peace in the Far East for Japan means the guarantee for Japan's propagation of her fundamental ideal, and all governmental policies are co-ordinated to it, no matter whether adopted as an internal measure or otherwise. The annexation of Korea was effected for the furtherance of this ideal, and it is much to be regretted that this fact is often forgotten now.

Protect Koreans.

There are from 800,000 to 1,000,000 Koreans living in various parts in Manchuria and Mongolia. With compunction we remember that their existence has been ignored by the Japanese authorities and leaders of public opinion. Koreans are all subjects of the Emperor, and yet their lives and property have long been permitted to be subjected to unspeakable oppression by the Chinese authorities. This was a very grave blunder. The authorities should long ago have taken steps to protect them. It is the duty of the Japanese government to assure their safety and means of livelihood in Manchuria or elsewhere.

It was the mistake of the Japanese that, in their Manchurian policy, they have concentrated their attention on their rights relating to railway, mining, and other economic problems only. Because they always spoke of their special rights, they called upon themselves an undue degree of international suspicion, ending up placing Japan in an isolated position. Taking advantage of the present Manchurian entanglement, the Japanese must convince other nations that Japan's action is solely in the cause of peace and humanity.

There are also hundreds of thousands of Koreans making home in Eastern Siberia. Their conditions are no better than those of their countrymen in Manchuria and Mongolia. We must see to their wants the same as elsewhere, and take proper steps to accord them the needed protection.

Japan is famous from ancient times as a nation making much of arms and the men behind them. However, it should never be overlooked that at the same time the Japanese have been scrupulous, as no other people have been, not to use arms where their use was unjustified. Not to draw the sword (easily) has ever been a rule of the samurai code. Japan has never engaged in war where she has not been forced to do so for the security and maintenance of peace. The Imperial Principle does not allow the people to engage in a mere aggressive war. This is the reason why the Japanese are united in national emergency. It is superficial observers who think that Japan is a warlike nation, fond of resorting to arms. No other nation is more scrupulous than the Japanese in the use of strength.

The Japanese should not follow the example of the other Powers. The Japanese have a glorious principle which has existed for three thousand years, and they should follow it as the only means of propagating the national ideal of peace. We should not be led astray by a materialistic conception of life; we should away with the epicurian tendency in thought and living; we should not be biased by petty scruples of narrow-minded patriotism. We have a great thing to guide us, which counsels us not to be easily swayed by outside criticisms of those who do not appreciate the motive power which drives us on, but to be assured that they will come to appreciate us in the long run.

French Example Cited.

The French surprised the Iron Chancellor, Bismarck, by paying the enormous indemnity after the war of 1870 within three years. That feat was possible simply because the French were united in their feeling against Germany. When the French were pitted against the Germans in the recent world war, the French were (never) discouraged by repeated defeats, but came back afresh with reinforced energy to fight the enemy to the last man. Though large areas of land were devastated in the course of fighting, the French quickly recovered, and France today ranks as the second richest nation in the world, only next to America. It is well known that all the French have achieved is due to their spiritual unity. We have a very good example in France to learn that not petty patriotic thinking but a greater national ideal, must be maintained and acted upon in order to carry a nation through diverse crises.

Problems of population and food stuff cannot be ignored or made light of. Nor can our various international problems. However, we should not be unduly harassed by each of them separately. We should view them as a whole, taking a stand on a higher level of observation and set down our plans in accordance with the ancient spirit of the Imperial Principle which underlies the foundation of the Empire of Japan.

On the occasion of his enthronement the Emperor, in his edict declared that, in view of the recent movement of thought and divergence of interests in the economic sphere, the people should view the situation from such a standpoint as commands the whole view and strive for mutual prosperity, and colonize "where there are no boundaries." He has indicated the guiding principle for the people to follow. We must not lament lack of power, nor regret material wants. All depends on the energy of the people. Solve all problems with determination. Whatever the atmosphere in the Far East, or however unhealthy the atmosphere of the world, we need not be troubled much. The nation should be led to righteousness and to follow the great principle of the Empire set down at the time of its foundation.

POLAND—*Bellona*—February, 1932.

"Operations of Major Units," by Colonel I. Rowecki.

This valuable study of the fundamental principles of military operations of major units and their prac-

tical application in manoeuvres for the training of troops in time of peace, furnishes some very interesting information regarding Soviet Russia's preparations for winter warfare. As is well known, no special provisions had been made for winter operations by any of the powers before the Great War. When the problem became acute, as in the campaign in the Carpathian Mountains, situations were met as they arose. Since the war only France, Italy, Germany and Soviet Russia have undertaken specific measures to solve the problems presented by winter warfare.

The Soviet Army, as a result of its experiences in the Polish-Soviet war, in Karelia and the Murmansk Coast, attributes such importance to adequate preparation against the contingency of a winter campaign, that it adopted as its slogan the doctrine: "The colder the weather, the deeper the snow, the greater will be the activity of the Red Army." Elaborate preparations have been undertaken since 1925 in that direction, and the last three years show some very concrete results. The time of planning and experimentation is over. They have succeeded in solving the problem of transportation of personnel and materiel. Infantry and artillery as well as the other arms and services, the author states, have been trained in the operation of "aero-sleighs." Winter manoeuvres have taken the place of the traditional summer exercises.

It is noteworthy, the author observes, that military and technical writings on this subject are very popular in Russia, and they are being published on an unprecedented scale. Whole editions are sold out as soon as they get off the press.

SWITZERLAND—*Allgemeine Schweizerische Militärzeitung*—October 15, 1931.

"Camouflage as a Full-Fledged Arm." by Major Kaiser.

"Camouflage" or "tarning," as the author calls it, is the means of making invisible persons and objects. Although it is not a new discovery, it really gained full military recognition only in course of the World War. Conditions of modern warfare make effective camouflage an indispensable adjunct to military operations. To render our own troops invisible—of course assuming their correct tactical employment—is absolutely necessary to secure victory at a minimum of cost. It follows, that means of tarning must be provided for each man, beast and weapon. Effective tarning or camouflage must render the individual and his equipment invisible at a distance of 100 meters even in an open field. A machine gun crew must be invisible to an observer with binoculars at a distance of several hundred meters. In any event, camouflage must provide invisibility against aerial observation.

The author discusses a system of tarning invented by the Bavarian painter Linnekugel. It provides equally effective camouflage in bright and dull weather as well as under the varying conditions incidental to seasonal changes. In actual field tests skirmishers and machine guns were deployed in an open field. Although the occupied area was definitely marked, observers using field glasses could see nothing at dis-

tances from 400 to 500 meters. Advancing slowly while making a careful search of the terrain, the observers were unable to discover anything even at 50 meters. Numerous suspicious spots were pointed out by them, but none of them harbored tarning troops. In course of the test observers were asked to face about. While doing so the tarning was removed and "objects" became visible. Another "about face" while tarning was restored, and objects became as invisible as before defying discovery once more. The tests demonstrated the mobility and ease of manipulation of the camouflage. In a further test with troops advancing as in an attack, the camouflaged troops actually fired a number of rounds at 400-500 meters. Neither observers nor the advancing troops were able to locate the point of origin of the shots. Advancing under cover under simulated battle conditions the "attackers" soon began to disclose a degree of nervous tension which became quite acute when, at 100 meters, the camouflaged "enemy" opened a brisk rapid fire. In battle the situation would no doubt have developed into a serious panic.

It was noted, writes the author, that where the terrain offered natural concealment, such as bushes, grass, humps of soil, etc., the "attacker" invariably directed his fire against such natural objects. He concludes, that well camouflaged troops possess a tremendous advantage, both moral and tactical. They will suffer fewer casualties and may calmly permit a numerically superior enemy to approach to closest proximity and annihilate him within a few minutes with a well-directed fire. Tarning permits a considerable thinning out of lines and a considerable reduction in the size of the garrison required for a given area. The author is of the opinion, that the war of the future will be fought under the sign of the new system of camouflage called "tarning."

General Military Information

AUSTRIA. The peace army and reserves of European powers are as follows:

	Active Army	Reserves
France	612,000	4,100,000
Italy	250,000	3,500,000
Yugoslavia	110,000	1,500,000
Rumania	186,000	2,000,000
Poland	266,000	3,200,000
Czechoslovakia	130,000	1,000,000
Belgium	67,000	530,000
Russia	1,200,000	6,500,000

Based upon peace strength, France ranks first with 12 soldiers per 1000 population. At war strength, Poland mobilizes most heavily with 117 soldiers per 1000 population. Compared with these figures, the former Austro-Hungarian Monarchy with 31,000 officers and 364,000 men, inclusive of the Austrian Landwehr and the Hungarian Honvéd, actually mobilized in 1914 a total of 1,396,000 men, one-third of the present available man-power of France. (*Oesterreichische Wehrezitung*, January 22, 1932).

ITALY. According to the "Giornale d'Italia," the Italian division at war strength consists of 534 officers and non-commissioned officers, 9808 men, 681 horses, 150 guns, 54 tanks and 364 motor vehicles. The newspaper observes that the present division bears the stamp of the fascist regime and that, in the matter of equipment, it is fully apace with other modern armies. The principal characteristics of the Italian army are: extensive use of massed offensive weapons, strong artillery and the motorization of all essential elements of a mobile force. The smallest unit is supported by machine guns and artillery to the extent that it can execute far more difficult missions than was the case in the past. (*Deutsche Wehr*, December 18, 1931).

POLAND. The artillery of the Polish army consists of 30 divisional field artillery regiments, one mountain artillery regiment, 13 horse artillery battalions, 10 heavy artillery regiments and six independent anti-aircraft artillery battalions. During the range practice period artillery units are placed under the control of artillery group commanders, but at all other times they are subordinated to the commanders of the higher echelons of which they are an organic part. The artillery group comprises all artillery within a corps area with the exception of the anti-aircraft artillery.

The President of the Polish Republic exercises supreme command over all armed forces through the Minister of War and the Inspector General. The War Ministry has charge of all military and naval affairs. The Inspector General is the commander-in-chief designate of all forces in case of war.

Security on the eastern frontiers of Poland is provided by the "Border Guard Corps," a well organized corps d'élite of 1078 officers, 7,183 non-commissioned officers and 19,752 men. Its commander is a general officer. The command is in matters of discipline subject to the Ministry of War, but with reference to its special mission, pay and maintenance it is under the jurisdiction of the Ministry of the Interior.

The German, Czechoslovak and Rumanian borders are guarded by the "Frontier Watch" which, like the preceding, is organized along military lines with a brigadier general in command. The organization comprises five districts (regimental sectors) each of which is under the command of a colonel or lieutenant colonel. Each district consists of 3 to 5 circuits (battalion sectors) commanded by majors. In addition there are a number of separate mounted detachments. The Frontier Watch consists of 275 officers, 1,806 non-commissioned officers and 3,576 men. In matters of discipline this force is under the jurisdiction of the Ministry of War, but as to its special functions, pay and maintenance it pertains to the Ministry of Finance. (*Deutsche Wehr*, December 18, 1931).

SOVIET RUSSIA. *Tchassavoy*, a Russian periodical published in Paris contains an interesting article on the Red Army by the pen of A. Saizov, Russian emigré. Although bitterly hostile to the bolshevik regime, the author notes considerable progress made by the Soviet army during the past few years. In his opinion, the

Soviet army no longer lags behind the armies of neighboring countries in matters of organization and training. In some respects, notably in the matter of aviation, the Red Army actually surpasses them. The militarization of Russia is complete. There are no difficulties in the matter of replacements. Regulations are up to date. War industries have been placed upon an effective basis. The "Achilles heel" appears to be in the command. The author does not believe that commanders are qualified to meet the exigencies of modern warfare. The antipathy which exists between soldiers and politicians is likewise a fruitful source of possible difficulties. The army is apparently striving for its emancipation from political tutelage. (*Militär Wochenblatt*, October 18, 1931).

In a copyrighted article published serially in the Budapest daily, "Pesti Napló" Elias Tobenkin, a Russian, gives a graphic account of his observations during a recent sojourn of several months in Soviet Russia. He writes that Soviet propaganda is seeking to convince the masses that the success of the five-year plan is upsetting the equilibrium of the capitalist world. As a consequence class struggle is becoming more and more acute in the bourgeois states where the upper classes are seeking protection under the banner of fascism while the working classes gravitate towards bolshevism. In order to avoid the proletarian revolution, the capitalistic states, according to the leading minds of Moscow, will unite against the Soviet Union. War, they say, is inevitable because the capitalistic governments are determined to wipe out the Soviet state. In Russia, the author states, preparations against such a contingency accord to women a part fully as important as that assigned to men. Not only are the women trained and prepared to replace men in all civilian occupations, but large numbers of them actually receive military training. There are at present 250,000 women in active service with the colors. Of these, 60,000 are in the regular infantry, 55,000 serve in machine gun units, 40,000 are in the supply services, 10,000 in the Chemical Warfare Service, while the remainder belong to the artillery, air force and other arms.

In 1930, fifty women completed the general staff course. Many of the feminine veterans of the wars against White Russians hold important posts of command in the Red Army. In addition to the regular formations there are a number of territorial military organizations of women. The female battalions of Tomsk and Krasnoyarsk enjoy quite a reputation for military prowess. Mohammedan women are said to be splendid soldiers. They receive their military training together with Siberian troops of the line. Women reservists are called to the colors for annual maneuvers and serve side by side with regular troops. These maneuvers extend over a period of two months. After a refresher training course of two weeks women are assigned to male companies so that the proportion of females to males in each unit is about 30 per cent.

Voroshilov, Red generalissimo, in a recent address remarked that "women must serve in the army just as men. They must share with men in the duty of

defending the Union of Socialist Soviet Republics." (*Pesti Napló*, July 3, 1932).

"War is inevitable. We must strive to carry the war into the territory of our enemies who plan to assail us. We must achieve victory at a minimum of sacrifices." Thus spoke Voroshilov, according to Tobenkin, at the opening of the IX Congress of the Komsomol (League of Communist Youth) which claims a membership of three million and which is organized and trained along military lines. On that occasion, Tobenkin writes, Voroshilov advocated an intensive campaign of education to familiarize the population with aviation and the nature of aerial warfare.

The rapid growth of aviation in Soviet Russia is significant, Tobenkin states. In 1928, Soviet Russian airways covered 11,971 km. Two years later they had expanded to 26,500 km. In 1931 they increased to 46,412 km., while it is expected that the current year will see the Soviet airways grow to 71,122 km. The five-year plan envisions a total of 110,832 kilometers by the end of 1933. These airlines provide direct connections between Moscow, Turkestan, the Caucasus and Siberia. Russian schools of aviation show this year an enrollment of 15,000 pupils. The number of military airplanes in commission is a secret but according to Kibishev, head of the Soviet Planning Commission, there are enough of them for the defense of the country. There are seven rigid type dirigibles under construction. They will be named: Lenin, Stalin, Old Bolshevik, Pravda, Klim Voroshilov, Ossoaviachim and Kolkozniik. They will compose the Lenin squadron.

"Every factory is fortress," has become Soviet Russia's latest slogan. It is to signify that each factory is a bulwark in the Soviet line of defense which

will crush the enemies of the Soviet Union. Particular significance is attached to chemical plants. In 1929, there were in Soviet Russia only 4,200 graduate chemists. The Soviet leaders expect to increase their number to 30,000 by October, 1933.

Russia wants war, Tobenkin writes, not to conquer new territories, but to gain new adherents to the Bolshevik creed. In the minds of Soviet leaders, war is the best means for propaganda, and they fully expect that the next clash of arms will bolshevize a string of countries in Europe and elsewhere. With the spirit of the Covenanters of old, Red soldiers enter the trenches carrying the rifle in one hand and the doctrines of Marx in the other. (*Pesti Napló*, July 10, 1932.)

YUGOSLAVIA. The air force of Yugoslavia consists at present of 7 air regiments stationed at Novi Sad, Serajevo, Skoplje, Zagabria, Nish, Zemun and Mostar. Six plants engage in the production of aircraft within the Yugoslav kingdom. The largest of these, "Ikarus Zmaj," with shops at Zemun and Novi Sad, has a capacity of 200 planes per year. The concern operates with French capital. The "Blajkovik" plant at Belgrade is operated by a Czech corporation. Other aircraft plants are the "Rogozharsky" at Belgrade, "Petrovich" at Zemun, the motor works at Racovitza and finally the state-owned aircraft factory at Kraljevo with an annual capacity of 250 planes.

The construction of strategical highways aggregating about 2,800 kilometers is under consideration by the Yugoslav government which is likewise making plans for a general improvement of the rail and river transportation systems of the realm. (*Deutsche Wehr*, January 15, 1932.)



NATIONAL GUARD NOTES

Best Field Training Camps

FROM all over the National Guard comes the word that the field training camps of 1932 are the best ever held by that component of the Army. Attendance has been greater than ever before. Whole regiments showed up at camp with only a few men missing from the ranks. This is due to some extent to the depression and the fact that men are out of employment, but that is not the sole reason. There has been a steady development of the National Guard over the years. Higher standards of training are being insisted upon through the whole chain of command, and the fact that few organizations had recruit detachments, have contributed to the successful camps this summer.

Then too, the National Guard camp facilities are better than they ever have been before. Last year Congress included in the emergency relief bill an item of one million dollars for National Guard camp construction. This money was used by the Militia Bureau to improve the camp facilities throughout the United States, and to provide the essential installations looking to the completion of the various camps. The funds have gone far in that direction and practically all of the camps except those of recent founding are now complete in essential details. The funds available for 1933 for new construction are only about 10 per cent of the normal, but those for maintenance and upkeep of the camps are a little more than have been heretofore provided.

In view of the elimination of recruit detachments from the camps, it has been practicable to revise the training programs and schedules to include more tactical training and combat firing. The unit commander is assured of having the entire personnel of his unit for this training, except the necessary details incident to unit economy and administration. This permits a progressive scheme of training and eliminates a degree of repetition that has not been practicable heretofore.

Reports that have come to the Militia Bureau indicate that the troops have fared well on the reduced ration. Many States managed so well that the ration cost was even less than the 41 cents limit authorized by the Bureau. This is due to the decrease in the cost of practically all of the important components of the soldier's ration.

How Economy Act Affects Pay of National Guard

THE so-called Economy Act passed during the latter days of the session of Congress, contained a number of provisions which affected the pay of the

Officers of the National Guard and the administration of that component of the Army.

These questions were put up to the Comptroller General for decision, and he has rendered his opinion in unmistakable terms.

The points brought out by the Chief of the Militia Bureau are listed here and the decision of the Comptroller General is incorporated after each of them:—

(a) Is the field training pay of officers and warrant officers affected by the Act? Decision: "The field training pay of National Guard officers including warrant officers, being the same as that of officers of the Regular Army, it follows that their pay is reduced accordingly, that is by $8\frac{1}{3}$ percent."

The economies effected through this reduction in pay are to be impounded in the Treasury so that none of the money saved can be employed to reduce the deficit in the Militia Bureau Budget.

(b) Is the armory drill pay of officers and warrant officers affected?

(c) Is the administrative functions pay of officers affected?

The Comptroller General answered these two questions in one decision in which he held that: "Section 109 of the National Defense Act of June 3, 1916, 39 Stat. 209, as amended (U. S. C. 32:148) prescribes the pay of captains, lieutenants and warrant officers belonging to organizations of the National Guard at one-thirtieth of the base pay of their grade for each drill attended not exceeding sixty in any year; for officers above the grade of captain a pay not exceeding \$500 per annum; and for officers below the grade of major not belonging to organizations a pay not exceeding four-thirtieths of the monthly base pay of their grades is authorized for the performance of their appropriate duties. In addition a maximum of \$240 per annum is authorized for officers commanding organizations less than a brigade for the faithful performance of their administrative functions. As in any case no officer would be entitled for armory drill pay to as much as \$1,000 per annum by reason of the drill pay and administrative function pay, such compensation is not affected by the Economy Act."

(d) Is the pay of United States Property and Disbursing Officers who receive pay at the rate of more than \$1,000.00 per annum affected?

(e) Is the pay of caretakers who receive pay at the rate of more than \$1,000.00 per annum affected?

The Comptroller General likewise answered these two questions in the affirmative. Their pay is affected by the Economy Act and "subject to the reduction of $8\frac{1}{3}$ percent or to such lesser reduction as may be necessary to reduce their compensation to \$1,000.00 per annum."

The money thus saved is also impounded in the Treasury and cannot be used to reduce the deficit in the Militia Bureau Budget.

(f) May commissioned or enlisted caretakers be granted 15 days' annual leave with pay for the purpose of participating in field training with their organizations, which leave appears to be in effect, a "Military Leave" authorized by Par. 11, NGR 79?

The decision of the Comptroller General regarding this question decides that such a leave is prohibited by the Economy Act. He says: "The annual leave with pay of 15 days granted to caretakers of the National Guard by N. G. R. 79, is not restricted by the regulation to the time spent in field training. The duty of caretakers if enlisted men of the organization would necessarily take them with the organization and require participation in such training and no military leave would be necessary for that purpose. The only effect of granting them leave of absence with pay concurrently with the period of such training is to remove the restriction against the receipt of both their caretakers' pay and training pay at the same time. In no sense of the word is such leave to be considered as military leave such as is granted by the act of June 3, 1916, 39 Stat. 309, to civilian employees for National Guard training purposes. See decision 1 Comp. Gen. 602, as modified by A-27362, July 5, 1929. Accordingly, no leave with pay may be granted caretakers during the fiscal year 1933, such leave being prohibited by section 103 of the Economy Act."

These decisions have cleared up the controversial points regarding the effects of the Economy Act with respect to the pay status of officers of the National Guard for the fiscal year 1933. If the depression keeps up and like economies are deemed necessary next year it is contemplated that the reductions will be again provided for.

Army Extension Courses

THE announcement of the Army Extension Courses for the school year 1932-33 has been published and distributed to the service.

These courses are available to the officers and enlisted men of the National Guard and enrollment may be effected by forwarding the application through the regular chain of command.

The regulations governing the professional and technical requirements for appointment and promotion in the National Guard have been revised during the past year and the subjects included in the examinations for the various grades parallel the Extension Courses. This makes it practicable for an officer who contemplates coming up for his next grade to get his examination work behind him in an orderly and leisurely way. For every subcourse he completes, he gets a certificate citing that fact. When he appears before his examining board all he has to do is to present the certificate and he is automatically exempted from the examination covering that particular subject.

The same is true with respect to enlisted men who

are striving for a commission in the National Guard. Having made sure he is physically qualified and has the basic educational requirements, the soldier may enroll in the basic Extension Course, complete his subcourses which parallel the subjects required for the examination, get his certificate, and when he comes before the examining board all he has to do is to present the certificate. The No. 10 series subcourses are the ones in which he should enroll.

The subjects required under Military knowledge qualifications are:

1. Organization of the Army.
2. Military discipline, courtesies, and customs of the service.
3. Military law—The law of military offenses.
4. Administration.
5. Military sanitation and First Aid.
6. Interior Guard Duty.
7. Map reading and aerial photograph reading.

The scope of the ability qualifications includes that the applicant demonstrate that he possesses practical military training approximately equivalent to that acquired by a graduate of the C.M.T.C. Blue Course.

Having enrolled in the Extension Course you are required to complete a specified amount of work in order to retain the enrollment. During each quarter of the year except the 3rd quarter (July-September) you must complete at least one lesson of the course in which you are enrolled. During the full school year you must complete lessons or subcourses requiring approximately 20 hours of school work. In all of this due consideration is given to illness, absence from home or other circumstances beyond your control and before your enrollment is cancelled you will be given an opportunity to present your side of the case as to why you may have failed to meet the requirements.

The Army Extension Courses are conducted along the same lines employed by the best correspondence schools of the country. First, there is an assignment of a task, next, the preparation by the student to perform the task, and then an exercise or problem requiring the use of the knowledge gained. The solutions to lessons are forwarded to the instructor to whom you are assigned and he will give you the benefit of his comments and advice.

Last year more than 16,000 National Guardsmen availed themselves of the opportunity afforded by the Extension Courses and it is anticipated that a larger number enroll this year. They are appreciating the advantages offered by the courses more and more.

Militia Bureau Funds

DUE to a shortage of funds provided for the support of the National Guard for 1933, it has been necessary to curtail a number of the projects of the Militia Bureau Budget for the coming year.

The deficit for 1932 was \$2,200,000.00 and this amount was provided by the Congress at their last session. To this sum must be added \$1,184,496.00 which the Bureau of the Budget cut from the field training and other projects for 1933. This total rep-

resents the amount of the actual shortage for the fiscal year 1933 which has had to be provided for.

In arriving at the solution to this problem the most difficult that any chief of the Bureau has ever had to solve—General Leach adopted the policy that the strength of the National Guard should not be reduced below the normal strength at which it is now maintained and that its training in so far as armory drill and field training are concerned should not be curtailed. This policy necessitated setting aside adequate funds to provide for the pay of all officers and enlisted men who turn out for the 48 armory drills during the year; funds for the payment of administrative functions pay; and those for the conduct of the normal activities of the field training camps on the basis of 15 days training for all who turn out for this activity.

On account of large increased attendance at these training activities larger sums had to be provided than ever before in the history of the National Guard.

In accordance with the ruling of the Comptroller General $8\frac{1}{3}$ percent is to be deducted from the field training pay of all officers and warrant officers under the so-called Economy Act. Some may have the idea that the money thus deducted can be employed to help the Militia Bureau meet its obligations. Such is not the case. This money must be turned in to the Treasury and there impounded, not one cent of it can be used unless it is appropriated in the regular course.

Despite the agreement of the chairman of the War Department subcommittee appropriations to the effect that the Militia Bureau could come back this year for a deficiency appropriation to cover the deficit in armory drill pay and field training the Bureau of the Budget has indicated in no uncertain terms that they cannot and will not authorize the creation of a deficit with the idea of getting a deficiency measure through the Bureau to cover it. This action in effect required General Leach to balance the Militia Bureau Budget and this means the provision for all National Guard activities to the end that if not another cent is forthcoming from Congress the expenditures for the National Guard will not exceed the amount appropriated.

This means the transfer of amounts from a variety of projects to cover the shortage in armory drill and field training. After combing through the Budget and cutting projects to the bone General Leach managed to find \$2,218,823.00 without ruinous consequences to the National Guard. Even with this considerable amount there was still a shortage of \$1,216,043.00 that will have to be found from some source and it is still to be hoped that the Congress will provide the funds necessary to meet it. If they do not there will have to be further curtailment of other projects.

The projects which have contributed in a major way

to the deficit in armory drill and field training are, Procurement of forage, which was made possible through a reduction in the price of components of the forage ration; compensation of held, which was effected by requiring animal caretakers to care for a greater number of animals, and reducing the salary of motor mechanics; construction and maintenance of concurrent camps; army service schools, which means that a reduced number of officers and enlisted men can attend the courses this year; employment of range keepers; target range construction, in which this project must be abandoned entirely for the year, as it is practicable to maintain only those ranges now in existence; travel, visits of instruction, which will necessitate that visits to outlying units must be limited to come within funds available and which will reduce these visits from five to three; transportation of federal property; articles of the uniform; ammunition; repair of ordnance; and procurement of airplanes.

After Camp Recruiting

WITH a view to limiting field training camp attendance to those men who had the desired preliminary training, many units of the National Guard ceased recruiting activities over the two months' period just prior to going to camp.

Now that the camps are over, it will be necessary to fill the vacancies caused through the natural course of events. This should be done through the selection of the best available men, to the end that they may participate in as many as possible of the armory drills preparatory to next season's field training.

It is known that many units have waiting lists from which to select men for their vacancies. Some have been able through the wealth of available material to require their prospects to attend armory drills on their own time and qualify in the school of the soldier before they are regularly enlisted in the outfit. These fortunate units can absolutely eliminate recruits and untrained men from the summer camps and thus have every man available for the tactical training and instruction included in the camp schedules.

There is advantage in enlisting up to maintenance strength at this particular time because the terms of enlistment will expire during the months following the field training camps and insure to those who serve only the one enlistment a period of field training as the final event of their military service. To those who take on for another enlistment it is equally advantageous for they can go ahead with their advanced armory drill training with a view to qualifying for the non-commissioned officer grades.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at large. These Communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration.—A. H. Sunderland, Colonel, C.A.C., President.

THE COAST ARTILLERY BOARD

COLONEL A. H. SUNDERLAND, C.A.C., *President*

MAJOR J. D. MCCAIN, C.A.C.

CAPTAIN J. T. LEWIS, C.A.C.

CAPTAIN S. L. McCROSKEY, C.A.C.

COLONEL J. C. OHNSTAD, C.A.C.

MAJOR IRA A. CRUMP, O.D.

CAPTAIN H. C. MABBOTT, C.A.C.

Projects Completed During July-August, 1932

No. 661. Illumination of Mortar Pits and Gun Emplacements for Night Firing.—The old style method of illuminating gun emplacements and mortar pits was by means of flood lights. This system is obviously unsuited for service conditions, particularly because of the increased effectiveness of aerial observation. Numerous designs of illuminating systems have been tested. In all of these it was endeavored to obtain sufficient light to permit operation by gun crews but at the same time to cut down the visibility of the system from the air. In all tests aerial observers were used. The last system consisted of a lamp bracket with one small bulb to provide illumination for the breech of the gun. This system afforded ample illumination to permit the gun crew to work and was invisible to the airplane at altitudes above five thousand feet. It has been recommended that this system be adopted as standard procedure, that one battery be completely equipped with this installation.

No. 817. Time Interval Apparatus for Mobile Artillery (Wallace & Tiernon).—Recommended that no further action be taken on this project.

No. 881. Time Interval Apparatus (Rothenberg).—Recommended that no further action be taken on this project.

No. 893. Labor and Time Saving Equipment for Cleaning Seacoast Armament.—In order to reduce the amount of labor required in removing paint from seacoast guns, various time and labor saving devices were tested. A Hiskins device, a system consisting of a series of wire brushes, was used but this device was unsuitable for removing thick coats of paint from armament. Two types of pneumatic hammers were used. These hammers were superior to the wire brushes and functioned well when the paint could be flaked off, but were not completely satisfactory where only a thin coat of paint was on the guns. As a result of these tests it was recommended that only the blow

torch, hand sealing hammers and scrapers be adopted for use in cleaning seacoast armament preparatory to painting.

No. 900. Test of 3-Inch Antiaircraft Artillery Truck Mount T-1.—The 3-inch Antiaircraft Truck Mount T-1 consists of the 3-inch Antiaircraft gun M2 mounted on and firing from a Relay-Garford truck. This mount is extremely mobile, is rugged, capable of high road speed and functions with great ease on rough, muddy and sandy grounds. In the design of the mount, however, a special type of pedestal bearing, called the S. K. F. self-aligned bearing, was employed. Due either to weakness of the bearing or improper assemblage this feature failed during the test. It was recommended that this type pedestal bearing be given a further extensive test before being used in any type of 3-inch gun, and that the truck mount be accepted as the standard type 3-inch Antiaircraft Artillery gun for use as a quick reinforcing unit and as the type for use with the mechanized forces, and, as such, that it be attached to the G. H. Q. Reserve Artillery. Certain other minor modifications to the gun were recommended.

No. 912. Demountable Steel Tower for Seacoast Searchlight Use.—A demountable steel tower was developed for searchlights. This tower was to be used primarily on land not owned by the Government in cases where permanent structures could not be erected. The tower was tested during the searchlight exercises at Fort Humphreys, Virginia, to determine its suitability for antiaircraft artillery work. There was no need for this tower in antiaircraft artillery work. The test to determine its suitability for seacoast work was made at Fort Monroe, Virginia, and as a result it has been recommended that the tower be adopted as standard for use with seacoast artillery searchlights.

No. 913. Test of Panoramic Sight (British).—The British Panoramic Sight was submitted for test to determine its suitability for seacoast artillery. The sight contained some desirable features but was not acceptable in its present form. It has been recommended that a study be instituted to develop a design

of a universal panoramic sight for seacoast artillery, and that such design include certain desirable features that are to be found in some of the sights now in use.

No. 914. Test of Radio Set, SCR-183-T4.—This radio set is a small portable unit employing a wave length of five meters and is designed to operate between truck columns. The range of this set when operating from vehicles, or in hilly terrain, is too short to permit of its use with any type of coast artillery armament during wartime. It was accordingly recommended that this set be not accepted but that the development of a portable radio set of longer range continue.

No. 916. Jack Beam T1 for 155-mm Guns.—The T1 jack beam has a flange at each end to hold the jack in place and prevent slipping. This jack beam is superior to the type now in use; has been adopted by the Field Artillery; and was recommended for adoption by the Coast Artillery.

No. 923. Test of Sight Mount, M4.—Numerous tests have been held to determine a suitable sight for 155 mm guns. The Sight Mount M4, recently tested, was recommended for adoption as standard. It was further recommended that the Telescopic Sight, M 1909, and the Panoramic Sight, M 1917, as modified for the M4 mount be issued with all M4 sight mounts now ready, but that these be considered only as temporary optical equipment pending the development of more satisfactory types.

No. 925. Use of Paint on Gun Emplacements as a Means of Preventing Light Reflection.—In time of war it will be necessary to paint concrete gun emplacements to reduce their visibility from the air. The Coast Artillery Board recommended that a dark non-reflecting paint to assist in cutting down reflected light around gun emplacements at night be adopted as standard and that the color of the paint to be used be determined by the nature and color of the terrain surrounding the battery emplacement in question.

No. 928. Proposed Method of Altitude Determination (Mitchell).—Recommended that no further action be taken with the proposed design of a two station height finder submitted by Lieut. Mitchell.

Projects Under Consideration

No. 608-A. "Duco" Surfacing for Guns.—Painting completed—report will be made about July 1, 1933.

No. 800. Test of Radio Direction Finders.—Under study.

No. 814. Illuminating Device for 12-inch Barbette Carriage Model 1917.—Undergoing test at Fort Hancock.

No. 829-B. Instruments for Training of Stereoscopic Observers.—Instruments received—under test.

No. 871. Azimuth Pointer for 12-inch BC M1917.—Undergoing test at Fort Hancock.

No. 873. Service Test of Long Distance Seacoast Data Transmission System T-6.—Undergoing test at Fort Hancock.

No. 874. Service Test of Seacoast Data Computer T-3.—Undergoing test at Fort Hancock.

No. 886. Comparative Test of Antiaircraft Directors (T-8; M-2; and M1A1 Uncoupled).—Awaiting results of tests at Aberdeen Proving Ground.

No. 887. Test of Height Finder T-12.—Awaiting results of tests at Aberdeen Proving Ground.

No. 901. Modified Shot Truck and Guide for 12-inch BC, M1917.—Undergoing test at Fort Hancock.

No. 905. Preparation of Coast Artillery Memorandum No. 13.—Under study.

No. 910. Test of Field Telephone Type EE-8-T2.—Under test.

No. 915. Test of N. H. Powder Charges (D. P. Lot X-3701) For 12-inch Mortar M1890-08.—Tests to be held during October.

No. 920. Test of Fire Control Tower for Tractor Drawn Artillery.—Material just received—under test.

No. 921. Test of Light Weight Experimental Mask E27R4-E8R34-E8R47.—Awaiting tests.

No. 922. Comparative Test of Harrison and Signal Corps Time Interval Apparatus.—Signal Corps apparatus received and under test.

No. 924. Test of Signal Lamp Equipment, Type EE-84-T1.—Under test.

No. 926. Test of Homelite Generating Unit (12 Volt, 600 Watt D. C.).—Awaiting receipt of material.

No. 927. Test of Radio Set, Type SCR-177.—Under test.

No. 929. Experimental Field Chronograph (Jackson).—Under study.

No. 930. Test of Strickler Folding Table.—Under test.

No. 931. Test of Roller Bearing 3-inch Antiaircraft Gun Truck Mount T1.—Under test.

No. 932. Diaphragm Gas Masks E3R111-IV-III.—Awaiting tests.



PROFESSIONAL NOTES

Radio Communication in National Guard Encampment

By Capt. W. H. Emmons, Artillery Engineer, 240th C. A. (Me. N. G.)

DURING The annual encampment of our regiment in 1915, when I made my initial bow as a citizen soldier, the means of communication at the fort where we were stationed, aside from the regular fire control telephone system, were practically nil. This fact was particularly disadvantageous in the matter of controlling the tug that towed the pyramidal target. Instructions were given the tug officer on his departure from shore in the morning, after which he was left on his own with no further communication from shore than would be vouchsafed to an enemy fleet. He ran his course with no variation until the

it impossible to tell the amounts of overs and shorts until the tug returned to shore. These conditions appear to us now extremely antiquated in view of our present advancement, brought about chiefly through the use of the radio.

The 240th Coast Artillery, with headquarters at Portland, Maine, is unique in its present make-up, consisting as it does of one battalion firing 12-inch guns of fixed armament, one battalion of two batteries firing 155 mm. G.P.F. tractor drawn guns and an antiaircraft battalion of three batteries. Of this battalion one battery is equipped with 3-inch AA fixed guns,

STATION	TYPE OF SET		POWER SUPPLY		FREQUENCY RANGE			ASSIGNED FREQUENCY	BATTERIES REQUIRED	
	TRANSMITTER	RECEIVER	DYNAMOTER	POWERED BY	TRANSMITTER	RECEIVER	COMMON		ON CHARGE	IN SERVICE
AX-1	B.C.-86-A	B.C.-98-A		110V A.C.	600-1000	2722-1000	600-1000	760 KC.	3	3
GS-3	B.C.-129	B.C.-144	D.B.-46	4V BATTERIES	850-1500	600-1300	830-1300	800 KC.	4	4
BT-2	B.C.-129	B.C.-144	D.B.-46	4V BATTERIES	850-1500	600-1300	830-1300	1130 KC.	5	5
AG-5	B.C.-86-A	B.C.-98-A	D.M.-13	4V BATTERIES	600-1000	2722-1000	600-1000	720 KC.	6	6
BJ-8								705 KC.		
CE-8								SILENT		

STATION	LOCATION	KEY OPERATOR	RECORDING OPERATOR
AX-1	FT WILLIAMS	SGT. GORWOOD	PVT. CONROY
BT-2	STEAMER RANDOL	SGT. LITTLEJOHN	PVT. LAWRENCE
GS-3	PORTLAND AIRPORT	SGT. CARR	NONE
AG-5	MOBILE	CORR. MODES	"

— SILENT STATIONS —		
FT. WILLIAMS	BATTERY BLAIR	PVT. CONROY
	BATTERY DEHART	" "
FT. LEVETT	BATTERY BOWDOIN	CORR. MODES
	BATTERY FOOTE	" "

Fig. 1. 240th C.A. Radio Net in H. D. of Portland, July, 1932

time arrived, as previously designated, for him to return to shore. If he were running a course for 6-inch guns, as was then the case, and the weather cleared sufficiently for firing guns of larger calibre, another boat must be dispatched from shore with a message for the tug to move out on a more distant course.

This lack of communication seriously handicapped the firing and held back the efficiency of the regiment. Terrestrial spotting from base end stations was not yet developed and spotting by airplane was not yet a dream. Hence, there was no adequate adjustment of fire and much was left to the gun pointer to make a good showing for his battery. Although range rakes were used on the tug, lack of communication made

one with machine guns and the third with fixed and portable searchlights.

The reorganization of the regiment on its present basis called into existence many new problems in communication. As communications officer, it became necessary for me to study the situation and provide for the regiment a system of communications by which the mission of each unit might be carried out efficiently. Since the reorganization took place in the early part of 1931 and information was not forthcoming until late spring as to exactly what armament could be furnished the new units, the encampment of 1931 became largely experimental. This was equally true in matters pertaining to communications. While new

telephone lines had to be arranged and laid out, the greatest problems that arose concerned radio communications. Fortunately we had been building up an efficient staff of radio operators by sending picked men to the Radio School at Fort Monroe. These men have been of much value in helping to sense the needs of the regiment and to recommend changes for bettering conditions.

An army airplane had been arranged for each year to fly from Boston for work in spotting the shots of the 12-inch guns. This plane was equipped with radio for both sending and receiving, and rendered valuable service. An additional plane for towing a sleeve target for antiaircraft drill and service firing was now provided. These planes landed at the Portland Airport about six miles distant from Fort Williams where the regiment was stationed. In order to communicate with the airport it was necessary for us to use the commercial telephone lines through the city of Portland. As only one line connected the city with the airport, delays in transmitting messages were long and frequent. At one time, forty minutes elapsed before a message could reach the aviators. This condition was intolerable and called for remedy.

As we entered the armory training period last fall, it became clear that plans must be formulated with care in order that communications for the 1932 encampment might proceed without delay. A study of the situation revealed radio as the greatest possibility for communication with the airport. Then the difficulty arose of providing a sufficient number of radio operators, since at that time we possessed only three. Experience had shown that two operators were constantly needed on the tug, since on courses 18,000 to 20,000 yards from shore any rough weather made frequent reliefs imperative.

Since, owing to rigid economy forced upon the War Department, we were unable to send more men to Fort Monroe for instruction, we found that we must create our own radio school. We were wholly without radio equipment at the armory, and crowded conditions allowed us no suitable room for conducting a school. We were finally able to make ourselves comfortable in an old shot hoist room with a table, a few chairs and a blackboard, and I set out to enlist the cooperation of the battery commanders for furnishing recruits to the school. A class was soon arranged and a definite program of instruction laid out, most of the year's work being given over to the study of elementary electricity. Sergeant Gorwood did most of the instructing and patiently led the men step by step thru all difficulties as they arose. All the equipment used was furnished by the men themselves. By spring the class had dwindled to three enthusiasts who were transferred to Headquarters Battery and assigned to radio work. A certificate was presented by the regiment to each man who completed the course. These men later proved the value of their year's training and did their share towards making our plans successful.

The next step was to secure sufficient equipment for use at this year's encampment. The Eighth Coast Artillery, stationed at Fort Preble, rendered great

assistance by providing us with everything at their disposal which we required. A condemned radio set for sending and receiving, which their radio sergeant had rendered serviceable, was issued to us for use at the airport. By renting a small room there we were able to house it throughout the encampment. This set worked perfectly and placed us at all times in immediate communication with the aviators. Another set, secured from the State Quartermaster, was placed on a small covered truck to serve as an auxiliary station at the fort (AG-5, Fig. 1). This set, however, was not needed. Radio receiving sets were placed in the B.C. stations at the 12-inch gun batteries at Fort Levett and at the batteries of the 155 mm. G.P.F. guns at Fort Williams for rapid reception of spotting from the airplane. One AA target-towing plane carried a receiving set. The net control station, AX-1, being located near the Fort Commander's station, was

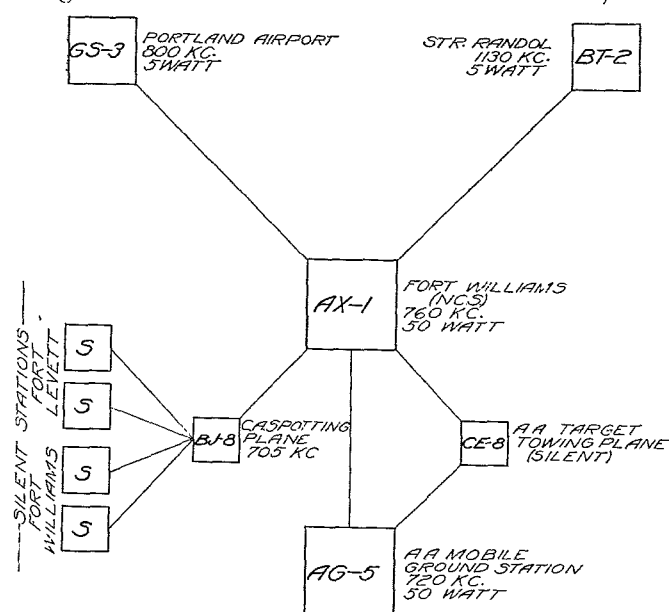


Fig. 2.

easily supervised. Fig 2 shows the kind of equipment used in the various stations as well as the location of stations.

The teamwork of the operators was excellent, and constant supervision prevented misunderstandings and gave an opportunity for a check-up on messages. Careful logs were kept at the net control station, on the tug and at the airport. The knowledge that they were functioning efficiently and that the excellent results obtained were due largely to their careful work during the armory training period gave all radio men considerable pride in their work. They carried from camp the satisfaction of having done their work well and of having merited the approval of their superiors.

Our experience this year proved conclusively to our minds the need for thoroughly trained radio operators, the value of a carefully planned program for armory training, even if under adverse conditions, and the superiority of radio communication over telephone service for long distances during field training conditions. We feel that for the 1933 encampment we can make still further improvements.

The Story of a Railroad

By Capt. E. A. Manthey, C.A.C.

THE Harbor Defenses of Pensacola are located on the western end of the long narrow island of Santa Rosa which lies a mile due south of the garrison post of Fort Barrancas. Troops garrisoned at Barrancas cross Pensacola Bay daily to their work in the Harbor Defenses and, for transportation over the widely separated installations on the island, depend on the recently completed Fort Pickens railway system.

In the summer of 1930 there were no transportation facilities on the island. Within the seawall at the western end there was a paved road system giving access to batteries and the Ordnance store room. The Ordnance machine shop and Engineer store rooms were off the roads. Remnants of a thirty-year old, thirty-six inch gauge, thirty-pound rail, railroad with no rolling stock of note ran its rusty way to unimportant places and connected the broken down, soon-to-be abandoned, engineer dock with an installation fourteen hundred yards to the east. On the way, this track at one time served a mortar battery, searchlights and power plants. A spur from this track had served a battery to the southeast but when two thousand dollars had been allotted to extend the mainline, this spur had been robbed of its rail and the railroad apparently robbed of its allotment. Fishplates were rusted out; ties were decayed and only with difficulty could a small four wheel flat car be pushed over the track to deliver a drum of oil.

East of the eastern end of this track lay a trackless wilderness of sand dunes studded with jack pine, observing stations, searchlights, and batteries. Batteries installed in this area had been barged to the shore and manhandled on rollers across the sand to their positions. Artillery Engineer and Ordnance personnel carried their tools for repair work on their backs. Base-end and searchlight details had to precede troops in the morning and by the middle of the morning they had to close station in order to have time to walk back to the boat for dinner. An Artillery inspection of this area in the cold of winter or the heat of summer was more trying to the high command than a night out. Reserve Officers in the summer trudged a mile and a half over the sand to Battery Fixed and arrived at their guns too fatigued to go to work. In this area was a barbette battery, built after the war, which stood without communications and therefore without ammunition. If ever a place needed a first class railroad this was it.

It was at this time that Major C. K. Wing assumed command of the Harbor Defenses. His second in command was Major A. D. Chipman who had recently joined. To both the need for the road was obvious. Funds or no funds a railroad was going to be. The Corps Area was asked if they had any junk. Somebody somewhere dug up an old request for a gas-driven hand car and it arrived. Troops were put to doing what could be done with the old track. In a month the Corps Area said it would ship old rail from

river and harbor projects in Ohio. Gas transportation was established at risk to life and limb over the old track and the first and easy phase ended.

In November Colonel F. H. Lincoln arrived and assumed command of the Harbor Defenses. For the first few days preceding his first artillery inspection, his views toward continuance of construction were unknown to those who had it at heart. At this stage of construction, it was still necessary for men to pack equipment and supplies over the one and one-half miles of sand between the searchlights located beyond the Coast Guard station, and Battery Fixed, and he saw at once the necessity for a railroad connecting all units of the defenses. Since that day the future of the project was assured and anything for the railroad has met with his approval. He removed obstructions with dynamite where a timid soul would still be writing letters, or, he circumvented them with sound engineering advice.

When our rail arrived from the Ohio river we had a surprise. It consisted largely of 110-pound rail suitable for the mainline of a Class A railroad. Meanwhile Battery B, 13th Coast Artillery, under Captain K. C. Bonney had constructed a mile of right of way for the extension to connect with Battery Langdon. This road bed was built of pure white sand through sand dunes and over some five hundred yards of swamp and, before a rail was laid, it constituted a vast project unaided by labor saving machinery. The big problem now was how to make a railroad out of a sub-grade and the salvaged rail. Thousands of track bolts, spikes and ties were required. The solution of the metal problem was not obvious, but trees were being marked for ties when a benevolent Corps Engineer released three thousand dollars to us. What prompted this has never been known. The road was never an approved project. It was not on paper. It was simply being built as best it might be by a command determined to get itself out of the sand. The men knew it and took pride in their work. They worked for a year through sun, wind and rain and in the Spring legitimate demands for transportation had already outgrown facilities. The big work was done. Prisoners replaced troops to grade and level and finish up. Troops rode trains.

With the summer came a lull in railroad work. Other tasks demanded attention for after all this was an Artillery and not an Engineer command. But by the end of the summer the following definite railroad objectives had been evolved:

- (1) Capacity: One firing battery or guns up to six-inch in single load.
- (2) Location: Served every battery, storehouse, machine shop, searchlight, power plant and dock in the Harbor Defense.
- (3) Right of way: Minimum grades; high speed curves.
- (4) Track: Sixty-pound rails on creosoted ties, 36-inch centers standard of construction, spring frog switches.

This was a fine paper objective with no funds in hand or in sight but it was approved by Colonel Lincoln and the next thing was to bring it about.

Lying disused for many years at Fort Morgan were two excellent double truck flat cars twenty-two feet long of eleven-ton capacity each, but of twenty-four inch gauge. Our road was thirty-six inch gauge. There was a possibility that something might be done with these cars and they were brought to Fort Pickens by boat for examination by railroad shop men in Pensacola. The Corps approved the limited funds necessary and both cars were delivered to us shortly thereafter in perfect condition for our use. We now had the cars to carry the load and the Corps was asked to supply the locomotive to do the work. By this time our efforts were well known at the Corps. Corps inspectors who had done prodigious walking in the past made their second inspections in cool comfort by rail and a fine new four-ton gas-driven locomotive was soon delivered. No better choice of motive power could have been made as it fitted our loads and speeds perfectly. Thus by the end of November our capacity objective had been accomplished.

With the advent of the new locomotive, attention soon focused on an old condemned gas-driven locomotive. Engine and cab were stripped and buried. Fine large Timken bearings were found in perfect condition, as well as the wheels, but the great casting weighing many tons which formed the chassis was deeply rusted. For a week the favorite evening recreation for two officers consisted in efforts to design a sort of royal chariot for the Harbor Defense Commander, General Officers and other dignitaries. As usual there was no money. The heavy metal locomotive chassis did not lend itself to such luxurious purposes and couldn't be altered. But bigger problems than this had been solved and it went the way of all the rest, to the end that, just before Xmas the Harbor Defense Commander, on arrival at the Langdon dock accompanied by the Corps Area Inspector, found awaiting him on the end of the train a good looking private car with a capacity for six officers on spring-upholstered seats. Sand blasters, carpenters, and Duco artists had done their work well and the cost to the government had been \$1.80. The most difficult problem had been to keep the job from being found by the Harbor Defense Commander before it was finished, so as to keep it a complete surprise.

With the coming of Fall, new construction was directed toward the Fort Pickens Quartermaster dock. Troops moving up the island had been losing twenty minutes a day walking to and from the railhead. To move this railhead to the dock required five hundred yards of construction, involving a deep fill. Rail for the project was salvaged from an abandoned dock at Fort McRae and this thousand yards of steel was barged across the bay and the work completed, but not without exhausting supplies of rail, bolts and spikes. Thousands of yards of essential trackage still remained to be built or re-laid with sixty-pound rail. Ties were on hand—nothing else, but again at the right moment fortune smiled.

There are still officers in the service who don't think much of rubbing shoulders with civil life but good friends in Pensacola insured completion of the railroad when funds were also nil. It was a Rotary contact and Rotarians are inclined to do things in a big way. Knowing our financial straits, sixty-pound rail complete with angle bars and high speed switches, were laid down on our dock for four dollars a ton when competitive bidding was seventeen dollars for steel and switches at seventy dollars each. When money became easier this was raised to six dollars and an unlimited quantity offered.

With this fine quality of steel, project after project was completed. Captain J. C. Craig with Battery A, 13th Coast Artillery, specialized in tearing out old rail and building in the heavy steel without interrupting traffic. Battery B with mules and scrapers built a new line to the 10-inch batteries. Today scheduled trains operating over well-ballasted roadbed deliver men, guns and ammunition throughout the harbor defenses. Engineer and Ordnance materiel and equipment together with communications are better kept up. Men arrive at their tasks fresh and ready to work and when the work is done they return in comfort. Time is saved everywhere. Already a fixed anti-aircraft battery has been dismounted and shipped away by the railroad that served it and its replacement delivered in the same manner.

A half mile of secondary line is yet to be built when funds can be found, but now, after two years of interesting planning and supervising on the part of the officers and mighty hard work on the part of the men, The Fort Pickens Railroad System is an accomplished fact. It is unusual, in that the hard prolonged labor involved has never appeared to the men as having been forced upon them by the command. Rather, its development has been spontaneous within the command. Enlisted men of former railroad experience have made themselves known and asked to be detailed. Privates have been made corporals and corporals marked for promotion through railroad opportunities they have used to show their worth.

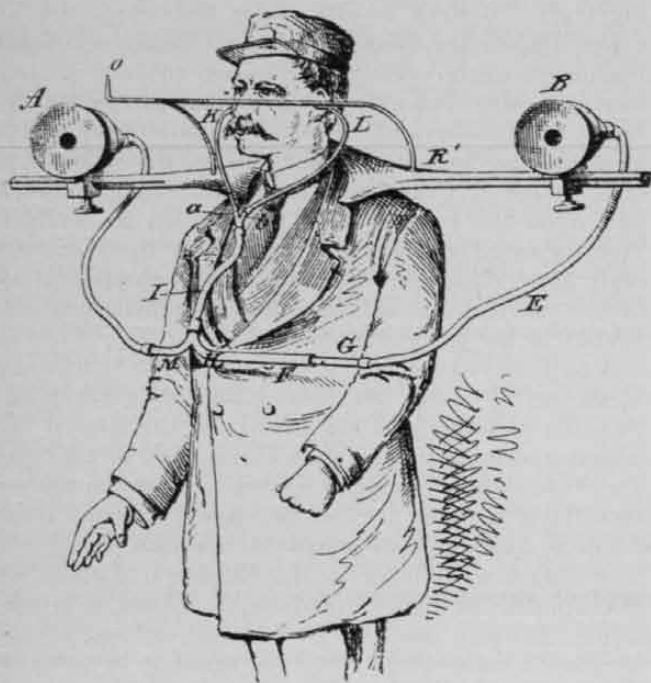
It is one thing to build a railroad and another to maintain one. After trying various methods, the entire system was divided into two sections each with approximately two miles of track and each assigned to the firing battery using it the most. Maintenance is now decentralized to the battery commanders who direct their own maintenance crews to maintain their sections of track in accordance with established standards and to the grade and level established by survey. By continuance of this policy, those, who have evolved and built this road hope that future commanders will maintain it up to the present high standard attained.

The Topophone

ONE of our best known reserve officers is Colonel Robert S. Allyn, commanding the 607th Coast Artillery, with headquarters in New York. Colonel Allyn is a patent attorney and some time ago discovered a patent granted to one Alfred M. Mayer of

South Orange, N. J., in 1880 which should be of historical interest to all anti-aircraft artillerymen. Mr. Mayer called his invention a "topophone" which appears to be as good a name for a sound locator as any because that is all the instrument is. This may surprise readers of the JOURNAL who imagine that the sound locator was a development of the World War. It may not surprise those of nautical experience since instruments which would assist vessels to determine their location in fogs have long been the subject of study.

Naturally it did not occur to Mr. Mayer that a similar instrument would be used in the location of airplanes so he emphasized only its usefulness in enabling a vessel to determine its position during fog.



Extracts from his description of the apparatus are interesting:

My improvements relate to a method of and apparatus for determining the direction relatively to the point of observation of a sound-producing instrumentality, and hence, by a series of observations conducted at two or more different points upon the same base-line, affording the data necessary for determining the distance of the sound-producing instrumentality from the place of observation; and my invention consists, broadly, in the application to the same sound-wave surface of two resonators, tuned to the pitch of the sound under observation, and fixed at a distance from each other somewhat less than the length of the wave of such sound, and connected by means of tubes to a single pipe, to which the tubes conduct the sound-vibrations collected by the resonators, and by which such vibrations are conducted to the ear of the observer, whereby, when the connecting or confluent tubes are alike in length, the sound so collected from the same wave-surface and conducted to the ear of the observer is augmented in intensity;

or, on the other hand, when the connecting tubes are relatively varied in length, the sound so collected and conducted to the ear of the observer is diminished in intensity, by reason of the greater or less degree of interference of the sound-vibrations, such interference being greatest when the relative difference in the lengths of the connecting-tubes amounts to or includes a length equal to one-half the wave-length of the sound. As such augmentation or diminution in the intensity of the sound is only manifested when the mouths of both resonators touch, or nearly touch, the same sound-wave surface, and as the sound-wave surface is substantially a sphere at the center of which the sound is produced, it follows that when both resonators touch the same sound-wave surface a line drawn from the mouth of one resonator to the mouth of the other is a chord of the sphere, and that a line perpendicular thereto is a radius of the sphere, or, in other words, coincides in alignment with a line drawn from the place where the sound is produced through the place of observation. By moving a measured distance laterally at an observed angle from the radius-line thus found a second radius-line may in like manner be found. The distance between the two points of observation is the base-line of a triangle of which the two convergent radius-lines are the sides. The length of this base-line and the observed angles therewith of the two radius-lines constitute sufficient data for the computation by familiar processes of the length of the two sides of the triangle or the distance of their point of junction, and hence the distance of the sound-producing instrumentality from the place of observation.

I call my apparatus the "topophone," and my invention incidentally includes means of adjusting the two resonators at variable distances from each other, means of varying the lengths of one or both of the connecting-tubes, a suitable frame for the support of the various parts of the apparatus, affording an axis of oscillation which is substantially perpendicular to a line drawn from one resonator to the other, and a pointer which is substantially perpendicular to the axis of oscillation and to a line drawn from one resonator to the other.

My invention may be employed either upon land or water; but its principal object is to facilitate the safe navigation of a vessel in a fog. In the latter case a base-line is obtainable by sailing the vessel an observed distance in a straight line from one point of observation to the other.

My topophone may either be permanently erected upon a vessel or other structure, or it may be made in portable form, as will be seen on reference to the drawing which is a perspective view of a portable topophone.

Two resonators, A and B, are each supported transversely upon the bar R' by means of a sliding connection, so that they may be respectively adjusted equidistantly from the center of the bar and at variable distances from each other. The resonators are of the usual telescopic construction, and are tuned in the ordinary manner by sliding in and out the telescopic joints, or by varying the area of their mouths.

Sound-vibrations received in the mouth of the resonator A are conducted through the preferably flexible tube to one of the branches of the pipe I. The opposite branch, H, of the tube I receives vibrations collected by the resonator B through the longitudinally adjustable tube, provided with the telescopic joints F and G, by which it is made capable of being lengthened or shortened by sliding the tube G in or out of the tube F. The opposite end of the pipe I is also branched, and two flexible tubes, L and K, are connected respectively, with the branches *a* and *b*, for the purpose of conducting the vibrations simultaneously to both ears of the listener or observer.

When my apparatus is constructed in portable form the bar upon which the resonators are supported is adapted to fit the shoulders, back, or some other part of the person of the observer. It will be seen that the pointer or index O is secured to the bar R', which extends in front of the median line on the face of the observer, to serve as an index to the direction of the sound.

In using my topophone the resonators are first tuned to the pitch of the sound to be observed. This is effected by sliding the telescopic joints of the resonators in or out in the usual manner until the normal pitch of the resonator corresponds to the pitch of the sound to be observed. The resonators are then

adjusted equidistantly from the center of the bar, R', at a distance from each other slightly less than the wave-length of the sound to be observed. The apparatus is slowly rotated until the mouths of both resonators touch the same sound-wave surface. The observer, having the ends of the tubes L and K applied to his ears, will perceive a sudden augmentation in the intensity of the sound when the mouths of both resonators touch, or nearly touch, the sound-wave surface. The position of the pointer then coincides in alignment with a line drawn from the source of sound through the place of observation.

If desired, several pairs of resonators may be arranged upon the same frame, one pair above the other; but ordinarily I prefer one pair only.

I claim as my invention in a topophone, the method herein described of determining the direction relatively to the place of observation of a sound-producing instrumentality by rotating two ear-tubed resonators or sound-receivers about a common axis and observing their position when both resonators or sound-receivers are brought at the same time into position upon the wave-surface of the sound, or bear that relation in position to the position of the wave-surface in which they perceptibly augment or diminish, as the case may be, the intensity of the sound transmitted to the ear of the observer.

Thought For 1933

AN accident which might have resulted in permanent injury to some of the participants in the practice occurred during the subcaliber firing of one Coast Artillery battery manning 155 mm GPF guns during the 1932 target practice season, when the towing vessel was struck by a projectile.

Type of sight used: Panoramic sight, Model 1917.

Cause of accident as determined by a board of officers:

"There was an error of 100 mils in the setting of the sight which error was not noticed by Lieutenant, Battery Executive Officer, or Sergeant, Gun Pointer."

It appears as though the correct deflection was set on the thumb screw micrometer scale but that the main scale was in error 100 mils. Since the deflection was small the micrometer reading only was checked and through oversight no check was made of the setting on the main scale.

Organizations, with limited training, firing 155 mm GPF guns by the Case II as well as the Case III method will detail a responsible person to observe the safety of the field of fire along the line of metal.

COAST ARTILLERY ACTIVITIES

Office of Chief of Coast Artillery

Chief of Coast Artillery

MAJOR GENERAL JOHN W. GULICK

Executive

COLONEL W. F. HASE

Personnel Section

MAJOR G. F. MOORE

MAJOR S. S. GIFFIN

Materiel and Finance Section

MAJOR R. E. HAINES

MAJOR O. L. SPILLER

MAJOR J. H. COCHRAN

Organization and Training Section

CAPTAIN J. H. WILSON

Plans and Projects Section

MAJOR G. R. MEYER

MAJOR R. V. CRAMER

The Coast Artillery School

THE 1932-1933 session of the Coast Artillery School opened on Saturday, September 10, when appropriate exercises were held in the School auditorium. The principal address was made by the new Commandant, Brigadier General Joseph P. Tracy, who was introduced by Colonel Percy P. Bishop, Assistant Commandant. Music was furnished by the Second Coast Artillery Band and the invocation and benediction were made by Chaplain Ivan L. Bennett. In addition to the students and staff of the School, the exercises were attended by many officers and ladies of the post. Immediately following the opening exercises, the various classes assembled for selection of officers and for group pictures, after which each student drew and signed for texts and equipment he is to use during the first course. Study assignments were issued and active school work started on Monday, September 12.

A reception and dance was held at the Beach Club on Friday evening, September 9, in honor of the new arrivals on the Post. All officers of the post were required to attend. Attendance at this dance is considered to have satisfied the provisions of Post Standing Orders concerning the calling of officers upon one another. This was formerly a formidable task and the new custom has met with general favor. No dinners are held at the Club on the evening of the opening dance and the reception preceding the dance is so planned that all personnel will meet one another. During the remainder of the year, the following dances will be held under auspices of the Officers Club:

Friday, September 23

Friday, October 7

Friday, October 21

Friday, October 28 (Halloween Dance)

Friday, November 11 (Armistice Day Dance)

Thursday, November 24 (Thanksgiving Day Dance)

Friday, December 9

Friday, December 23 (Christmas Dance)

Saturday, December 31 (New Years Dance).

Dances will be held at the Beach Club until cold weather, when they will be held at the Casemate Club. Informal Saturday night dances will be held from time to time during the year.

Officers of the Officers Club for the ensuing year have been elected as follows:

PresidentBrig. Gen. Joseph P. Tracy

Vice PresidentCol. A. H. Sunderland

Secretary-Treasurer .Maj. E. H. Metzger

The monthly dues of the Club have been reduced to \$2.25. Dinners at the Club have been reduced from \$1.00 to \$.75 per plate.

The post and public schools opened on September 8. The Fort Monroe School, which is in charge of Captain D. H. Hoge, provides a complete grammar school for children from the 1st to 7th grade inclusive. Children of the post enrolled in higher grades attend schools in Phoebus or Hampton. A Kindergarten and nursery school, under the supervision of Miss Wainwright, is conducted on the post. An active Parent-Teachers Association is organized at Fort Monroe, Mrs. H. S. MacKirdy being President.

Summer Training at Fort Barrancas

THE most active Summer Training Camp period ever held at this post was brought to a close with the departure of 102 Reserve officers on August 27. During the period June 9 to August 27, approximately 3250 civilians comprising other components of the Army were trained at this station including the R. O. T. C., C. M. T. C., O. R. C., and three regiments of the National Guard, namely, the 202nd Coast Artillery (AA) (Ill. N. G.), the 203rd Coast Artillery (AA)

(Mo. N. G.) and the 206th Coast Artillery (AA) (Ark. N. G.). Below is given a summary of the training of the various elements of the civilian components of the Army:

R. O. T. C.

The R. O. T. C. opened on June 9 and closed on July 20. Total enrollment was 236 students representing The Citadel (Charleston, S. C.), Georgia School of Technology (Atlanta, Georgia), University of Alabama (University, Alabama) and Mississippi State College (A & M College, Mississippi). In addition to the rifle, students trained on and fired 155 mm guns, 10-inch disappearing rifles, and AA guns and machine guns.

C. M. T. C.

The C. M. T. C. opened on June 14 and closed on July 13. Total enrollment was 549 candidates consisting of 193 Basics, 203 Reds, 107 Whites, and 46 Blues, from the states of Florida, Alabama, Mississippi, Georgia and Louisiana. Candidates, in addition to the rifle firing of the Basics, were trained on and fired the 155 mm guns and the 10-inch disappearing rifles. Advanced students were trained on AA matériel.

O. R. C.

Generally speaking the O. R. C. was trained in three major groups. During the R. O. T. C. and C. M. T. C. 66 Reserve officers were trained in conjunction therewith. During the period July 31—August 13, 97 Reserve officers were ordered to this post for organizational training and during the period August 14—27, 102 officers underwent similar organizational training. While the majority of the reserve officers belonged to the Coast Artillery, some Infantry, Engineer, Chaplain, Quartermaster, Medical, Dental, and Signal Corps, Reserve personnel was also trained.

National Guard

Three AA National Guard regiments were trained at this post. First came Missouri, famous "hound-dog" band and all, for the period July 17—31. Colonel Loy's "show-me" regiment has trained here several times in the past and is a prime favorite with the local garrison. Following Missouri came Illinois, Colonel Charles C. Dawes, commanding, for the period August 1—13. This was the first appearance of an Illinois organization in Dixie and they brought a smart-appearing and well-trained regiment. Without casting insinuations, it might be noted that Illinois qualified the highest number of machine-gunners of any of the National Guard organizations which might be construed to mean that some of the men had previous training on this particular weapon, in other words, "The Boys from Chicago know their guns." (Editor's note: charge this crack to Manthey) Arkansas and rainy weather both made their appearance during the period August 14—20 but the boys from the home of the "Spa" were no respecters of inclement weather. Colonel Robertson had them firing between showers and the last record firing was being conducted by one battalion while the remaining battalion, was loading the baggage cars. All National Guard units were

highly satisfied with the availability of facilities at the post for their use and expressed a desire to return in future years.

Summer Camp Assignments of Personnel

Camp Commander	Colonel F. H. Lincoln, 13th C. A.
Camp Executive	Major J. H. Lindt, 13th C. A.
Fort Commander (Ft Pickens)	Major A. D. Chipman, 13th C. A.
Adjutant	Captain John Soule, Eng-Reserve
Surgeon	Major Louis A. Milne, M. C.
Supply Officer	Captain John J. Maher (CAC), QM
Ass't. Supply Officer	W. O. John F. Downs, U. S. A.
Artillery Engineer & Ord Officer	Captain Otta Marshall, 13th C. A.
Post Exchange & Finance Officer	Captain Philip W. Hardie, 13th C. A.
Mess Officer	2nd Lt. Robert F. Tomlin, 13th C. A.
Recreation Officer	2nd Lt. M. B. Raymond, 13th C. A.
Publicity Officer	1st Lt. J. H. Rousseau, CAC (DOL)
Chaplain & Citizenship In- structor	Captain J. G. Rousseau, Chap-Res.
Chief Clerk	St-Sgt. F. S. Hammers, 13th C. A.

C. M. T. C. Camp

Camp Commander	Major Walter K. Dunn, C. A. C.
Senior Artillery Instructor	Major A. D. Chipman, 13th C. A.
Assistant Artillery Instructor	Captain J. L. Craig, 13th C. A.
Editor— "CROSS CANNON"	Captain Luther P. Call, Jr., FA- Res.
Hostess	Miss Lillian Massey
C. O., Battery A	Captain E. R. Barrows, CAC (DOL)
C. O., Battery B	Captain A. K. Chambers, CAC (DOL)
C. O., Battery C	Captain J. H. Gilbreth, CAC (DOL)
C. O., Battery D	Captain K. C. Bonney, 13th C. A.
Inf. Instr. & Ass't to C. O., Btry C	1st Lt. Dorr Hazlehurst, Inf., (DOL)

R. O. T. C. Camp

Camp Commander	Major Paul H. French, CAC (DOL)
Adjutant	Captain W. Q. Jeffords, CAC (DOL)
Supply Officer	1st Lt. E. G. Martin, CAC (DOL)
C. O., Battery A	Captain E. R. Crowell, CAC (DOL)
C. O., Battery B	Capt. P. B. Taliaferro, CAC (DOL)
Instructor (Infantry)	Captain G. W. Dunn, Jr., CAC (DOL)

O. R. C. Camp

Instructor-in-Charge	Major Gooding Packard, CAC (DOL)
Unit Instructor	Major William S. Fulton, CAC (DOL)
Unit Instructor	Major E. H. Freeland, CAC (DOL)

The above staffs functioned smoothly and efficiently and to their untiring efforts and cooperation, the Camp Commander attributes a major portion of the credit for the successful operation of the Camps.

Conclusion

Fort Barrancas, having the only active harbor defense garrison in the 4th Corps Area, and having such splendid facilities for both harbor defense and anti-aircraft firings, its use and importance as the "Training Center of the South" for civilian components of the Army becomes more pronounced annually. During the past year reserve officers from the 8th Corps

Area and from the Corps Area Service Command at Fort Bragg, North Carolina, were trained at this post and the 202nd Coast Artillery (AA) (Ill. N. G.) travelled over 1,000 miles to reach this station for training.

The Harbor Defense Commander, who also functions as Camp Commander for the various Camps, Colonel Francis H. Lincoln, 13th Coast Artillery, has placed at the disposal of the various elements that train here, all of the facilities available to the regular garrison. Indicants that this attitude is appreciated are the many letters both from individuals and organizations, received subsequent to their training.

Rambling 'Round Barrancas Summer Camp

5:45 a.m., and the accursed bugler rends the air with first call. One-Two-Three-Four and the Bugaloos are earnestly, but more or less incoherently, trying to follow through the intricacies of setting-up exercises. "Quit Kicking My Dog Around" and you know that the Missouri boiler-makers are having their pre-breakfast band practice. Someone ought to "larn" them another tune. Mess call and the morning gallop for the chow line, and blare of whistles as you cram down the third helping of flap-jacks announcing infantry drill—out come the Bugaloos for the first Infantry drill; most of them have their breeches and leggins on and finish dressing during roll call—squads right; squads left; squads right-about; and the sweat begins to pop as Sol bears down in earnest—Boom Boom and Bang Bang as the band furnishes the cadence. A short respite while Charley Roach inspects the slide trombone; someone blew his false teeth through that instrument and ruined it—more drill, and then some more drill—at last rest—oh heavenly rest—while the Chaplain expounds on Citizenship—the one time in the whole morning when you can go to sleep and not be detected—chow call and the mad rush for dinner—the old battle cry "We Want Good Chow and We Want It Bad"—then to a P.M. of sports; baseball, swimming, tennis, field and track events—pity the poor Blues who dream through an hour of advanced gunnery while their minds are concentrated on tonight's hop—5:45 P.M. and the evening parade—lots of music and martial tunes; parade ground cluttered up with miscellaneous civilian components; the "Kernel" and the rest of the nobility parked in the shade on the South side of the parade ground—Lord it is hot and do the mosquitos bite—Bang; 'nother day 'nother dollar—then the shades of darkness fall and the fair damsels of the village assemble for the weekly hop—laughter—gaiety—music—silver slippers—marching shoes—promenades—and the day closes just before tomorrow—"Came the Dawn and Yawn."

250th Coast Artillery (C.N.G.) Has Good Year

By Capt. S. R. Dows, 250th C.A. (TD)

AFTER diligent training for ten months with Case III in mind and adjustment by the magnitude method, we learned of the 1932 requirements—bracket-

ing method of adjustment and the bow-on type of target. Ranges ceased to be the major consideration and deflections became the overshadowing threat.

In our panoramic sights, the vertical cross hair is a half mil wide which is one probable error.

We immediately recognised the desirability of Case

II and set about to lick the problem. As fast as our instructor, Major J. D. MacMullen, could answer one objection we presented more but he steadfastly defended Case II and it



was that which we used.

First we had to select a range at which we could see the target with our sights. From previous experience with visibility, six thousand yards seems to be about the safe limit although we have fired up to ten thousand. At the same time the range had to be sufficient that the splash would occur after the dust had cleared from in front of the guns. Six thousand yards, with a time of flight of about twelve seconds seemed ideal.

The second problem was to get gun pointers who could keep on the target. For five years we have used Case II because of visibility and because at least one practice was specified. With no armory facilities for Case II we resorted to week-end camps where we emplaced guns and drilled on available targets in the Golden Gate. Plotting room facilities of Battery Stotsenberg, Fort Scott, were used through the courtesy

of those in command.

So much for the problem and the preliminary work. The real training of gun pointers rested with the subcalibre firing at camp and fortunately the allowance was liberal.



With this training in the technique of Case II and with two settling shots per gun to check the pointers under service conditions we anticipated satisfactory results.

Our set-up at camp was conventional. We used the Cloke plotting board, Pratt range board, universal deflection board, range percentage corrector, travel board and wind component indicator. We have our own meteorological station in a tower which also serves as a look-out for the safety officer. Our T.I. system is standard field equipment adjusted to a 36 second interval so that we fire at 18 seconds.

Plans for spotting included a station on the flank with radio communication direct to the plotting rooms through a central receiving set. In addition to the terrestrial station we had a plane from the 40th Division Air Service in which some of our officers rode

as observers. Our experience with aerial spotting has been very gratifying with the magnitude method of adjustment and of course with the bracketing method it was ideal. The radio in the plane failed us in the middle of the practice however because of a battery burning out.

Communications were typical field installations with many improvements—the product of enthusiastic communications officers. They all worked mechanically but our personnel is not thoroughly indoctrinated with the result that messages don't always get through. The system was somewhat hampered at first by the functioning of message centers but that was remedied before firing by allowing direct conversation. However, there is no record of a reading lost or relay caused by faulty communications in three successive years so perhaps that is all that can be expected—even with permanent installations.

The results this year were rather gratifying. One battery hit a snag somewhere and turned in some



very wild deflections—a possibility in Case II. The score as a result does not properly represent the unit but it is one of the fortunes of war. Battery A has always done very fine work and this year was to have been the best ever. They bent every effort toward improving their technique but had some hard luck.

Battery C with a score of 100.5 has the honors. They made the bad mistake of sinking the target in the middle of their run and when a new target got on the course, found difficulty getting on. They might have made seven more points but for the material hit.

Battery E, last year's honor unit, made a fine showing with a score of 95.4. They too destroyed the target with five more shots to go and the fog rolling in. In the shuffle they did not fire the extra five so had a short practice.

Batteries B, F and D, all concentrating on fundamentals in their training made credible scores of 83.3, 76.5 and 63.5 respectively. (These scores have not been finally approved but are believed accurate.) The average score for the regiment is thus about 75 and that is quite a numerical improvement in spite of the method of scoring.

This regiment, commanded by Colonel R. E. Mittelstaedt, has been motorized since 1925 and is quite proud of its history as such. Going to camp is a three-way problem involving motor transportation, communications and service practice. With World War rolling stock a march of 80 miles with a bivouac

halt thrown in for good measure is a real job. Our mechanics have become so skilled and know their materiel so thoroughly that we always bring in all the vehicles. This year the problem was varied somewhat by the fact that our guns and tractors were moved from San Francisco to Watsonville by rail. The personnel for the heavy column moved by truck to Watsonville and drove the guns to Capitola from there.

The Regiment has been fortunate in having Colonel C. G. Bunker in the State as Senior Instructor. He is an inspiration to any organization at drill or play and we regret very sincerely the orders which take him soon to Panama. Serving as Inspector this year we had Major F. E. Emery, Jr. which was added good fortune. Completing the Board of Inspectors and continuing his good counsel Major J. D. MacMullen put in a busy two weeks. His job is to keep us busy with problems of various sorts and he certainly does just that.

In general, the 1932 Camp goes into the annals as the best ever. Our most promising battery kicked over the traces a little but they are still an excellent organization. A new sensation has come to roost with Battery C—that of being at the top from where it is a simple matter to fall. Already, the personnel is counting the weeks till another Camp time comes. Already the heroes are studying to defend their laurels and the lesser heroes are plotting to regain their glories. "Forty-nine more weeks till Camp!" That is the life of the National Guard.

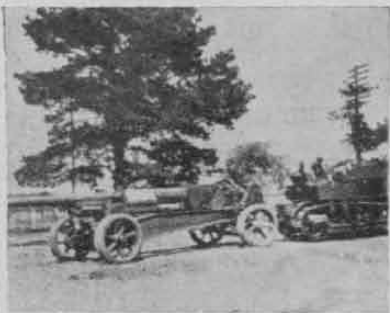
202d Coast Artillery (Ill. N.G.) Field Training

By Capt. R. S. Crowder, 202d C.A. (Ill. N. G.)

THIS regiment entrained at Chicago, Friday night, July 29, enroute to Ft. Barrancas, Fla. for its annual field training. Travelling in two sections—gun battalion in one train and machine gun battalion in the other—we reached Pensacola Sunday morning. Transferring to two Q.M. tugs we arrived at Fort Barrancas forty minutes later. The trip down was uneventful and without incident excepting an hour's stopover in Holly Springs, Miss., where everyone was ordered out to limber up.

All housing arrangements having been completed at Chicago, quarters were assigned each unit immediately upon arrival. By evening every one seemed to be oriented in their new surroundings and ready for the intensive training outlined in the first week's schedule.

Much time had been spent back home in the preparation of training schedules and programs. The gun battalion started in drilling with the new guns, director and height finder loaned us by the 69th Coast Artillery. Before the end of the week they were ready for preliminary firing. The searchlight battery had five searchlights and three sound locators on the field for instruction and were soon hard at work learning the peculiarities of the Duplex units and MIEI sound locators loaned them by the 69th. The machine gun



battalion was divided into three groups for training purposes: recruits, 1000-inch range men and aerial gunners. A progressive plan of training was laid down which enabled those men qualified to move up to the next higher group. By this method practically all of the recruits were given 1000-inch range training and many men moved on to aerial gunnery.

Each morning at 8 a.m. the two Q.M. tugs pulled away from Barrancas carrying the gun battalion to Fort Pickens and the machine gun battalion to Battery Langdon on Santa Rosa Island. These daily trips across the bay proved to be a very pleasant part of our schedule and served to refresh us after a morning's work under the hot sun.

The 107th Observation Squadron (Mich. N.G.) towed targets for us this year. With three planes, two in the air and one on the ground for emergency they kept as busy as the proverbial one armed paper hanger with the itch. A little difficulty was experienced with the targets, but in spite of these delays the batteries had progressed rapidly over the course of a week and were ready for record firing the second week.

This last week marked the opening of a siege of firing the like of which this regiment has never before experienced. Forgetful of meals and time the men worked right through each day to accomplish the one objective: Completion of record practice. Afternoon recreation periods were given over to firing, messes were held up and the tugs plied their way across the bay many times a day carrying troops to and from the firing points. The gun target towed at an altitude of nine thousand feet with a slant range of six thousand yards was at that range almost imperceptible making the practice a very difficult one for the persons charged with keeping the cross hairs on the target. Incidentally it is believed that this is the first attempt of a National Guard regiment to fire for record at this long range.

Night firings were conducted on two occasions during the last week the target being flown at seventy-five hundred feet altitude for this work. Night record practices were fired by all three gun batteries resulting in some very commendable scores. During this practice Battery D severed the target from the tow line and, illuminated by the searchlights, it fluttered down in a breezeless sky to be lost in the ocean.

The searchlight battery, the first time in its history, was enabled to "shoot" a record practice. Having had only a limited period of experience with sound locators they nevertheless proceeded to train crews for this work. After a week of training, the battery was ready for a record practice. Several miles of wire was laid to outpost listeners and from lights to C. P. The aviators were given their instructions and all was set to shoot. The darkness came with the ceiling unlimited and all was quiet except an occasional car moving down the road. Four courses were flown but beginning with the second a series of high clouds drifted by partially obscuring the sector. This added to the difficulties and the resultant score was not so good but the experience gained by all concerned was well worth the

preparation and trouble. The searchlights' work in "carrying" the gun targets is deserving of comment in that at no time did they lose a target once they got "on."

The machine gunners worked hard to develop a system of fire control producing the maximum of holes in the target. Using 1932 tracer ammunition with a 1200 yard burn-out-point tracer control and adjustment was thought to be the method productive of the most holes. Most of the courses were fired at a slant range of between 700 and 1100 yards with an altitude of 400 feet. The results obtained this year by the machine guns were most gratifying and the scores will bear this out as we are hoping to see at least a couple given an "Excellent" rating.

Major General E. L. King, commanding the Fourth Corps Area, honored us with a visit inspecting the camp and also witnessing the firing at both gun and machine gun positions. Later the Coast Artillery District commander, Brigadier General McNair, came over on a tour of inspection of the defenses to encourage us in our efforts.

By Friday of the last week much had been accomplished. All batteries had fired for record and the scores had been computed. Saturday, August 13, we broke camp and started our homeward journey detouring at Chicago, Monday morning, August 15.

Thus ended a tour of field duty that shall long be remembered—for more reasons than those quoted officially.

With the 970th AA Regiment at Ft. Barrancas

By Lt. Jeff Barnette, President

Houston AA Chapter Coast Artillery Association

HOUSTON'S own, the 970th C.A. (AA), was well represented at the antiaircraft training camp held at Ft. Barrancas, Aug. 14 to 27. Practically one-third of the thirty-two antiaircraft officers ordered from the Eighth Corps Area are assigned to the 970th. The Eighth Corps Area officers furnished the second regiment at this camp. The first and third regiment was made up of officers from the Fourth Corps Area.

Our group was commanded by Lt. Col. W. W. Holden. The camp was one of the most interesting held in the South in the opinion of the officers present.

In addition to a fixed battery of antiaircraft guns (permanent materiel at Ft. Barrancas) the 69th (AA) from Camp McClellan was present with a complete battery of mobile antiaircraft guns together with a searchlight and machine gun battery. Reserve regiments received individual instruction with the exception of record shooting, etc. Three unit instructors were present at this camp. Two from Fourth Corps Area and Maj. Wm. S. Fulton, unit instructor from the Eighth Corps Area.

Regimental assignments for the camp were as follows:

Commanding officer, Lt. Col. W. W. Holden; executive officer, Lt. Col. S. C. Lockey; Adjutant, Lt. Jeff Barnette; supply officer, Lt. J. B. Wilkinson.

The 970th Regiment dinner was an outstanding suc-

ness. This affair was held at Barn where the army and navy officers in Pensacola hold their social functions.

Permanent appointments in the 970th Regiment have been announced by Lt. Col. S. C. Lockey, commanding, as follows:

Executive officer, Major R. A. W. Barrett; Adjutant, Lt. Jeff Barnette.

The 955th Coast Artillery (AA)

Duluth, Minnesota

BY winning the U. S. Coast Artillery Association Trophy awarded for the year ending June 30, 1932, the regiment has attained its place in the sun. This regiment is scattered throughout the States of Minnesota, North Dakota, and South Dakota. This is a great handicap as any one regular officer who has been on reserve duty knows. But handicaps are brushed aside by Lt. Col. James R. Sweitzer, the regimental Commander, with the more than able assistance of Lt. Col. F. C. Tenney, Executive Officer, and Captain William H. Sweet, the regular army Unit Instructor.



1st Lt. Robert J. White, 955th C.A. (AA), Honor Student, 1931-32 — Completed 5 Subcourses 1931, Completed 13 Subcourses 1932.

The regiment is a mere infant, being organized in 1929 with a strength of only 42 officers. Its motto, "Ever Watchful, Accurate and Persistent," is no idle boast, for it immediately began a program of expansion which gave it a strength of 75 at the end of June, 1932. Nor were these "get rich quick" officers. That kind wouldn't have won the trophy for work in extension courses. Colonel Tenney, himself, held the record for extension course work during the year ending with June, 1930. But youth will be served and since that time Lieut. R. J. White has led for two straight years. They are a persistent bunch. Some time back they decided to send Lieut. Carl A. Anderson, the regimental Adjutant to the special course at the Coast Artillery School so that they would have at least one freshly appointed apostle of that fountain-head of wisdom in their midst. There was no conspiracy on the part of higher authority to deprive Lieut. Anderson of his mess of pottage but neither the Corps Area nor the Chief's office was permitted to forget the name of the 955th candidate for higher scholastic training. (Yes, he's down there now.)

On August 27, 1932, the regiment held its jump-off banquet at the Hotel Duluth, and brought forward a new set of objectives for 1932-1933. Here they are:

1. One hundred per cent enrollment in Extension School Courses. (We are now 98.9 per cent.)
2. One hundred per cent membership in the Coast

Artillery Association. (We are now 60 per cent.)

3. The completion of not less than four subcourses per officer. (We did it last year.)
4. One hundred per cent subscribers to the COAST ARTILLERY JOURNAL. (We are now 33 per cent.)
5. The winning of the Coast Artillery Association Trophy for 1933. (We now have it for 1932.)

Don't bet against them.

The 15th Coast Artillery (HD)

Fort Kamehameha

TAKING everything in its stride the powerful 15th Coast Artillery team crushed all opposition and won the U. S. Coast Artillery Association Trophy with a score of 100 per cent—all three of its firing batteries landing in the exclusive "Excellent" class.

Colonel Homer B. Grant commanded the regiment. Major Frederic A. Price and Major Berthold Vogel commanded the battalion.

Captain LeRoy Lutes commanded Battery A.

Captain V. P. Foster commanded Battery B.

Captain A. L. Lavery commanded Battery C.

Old timers will be interested in the designations these batteries had in the days of the Empire.

Headquarters Battery is the old 185th Co.

Battery A is the old 125th Co.

Battery B is the old 91st Co.

Battery C is the old 143d Co.

The 15th has been busy during the year on other matters in addition to the regular target practices. One of the most important of these projects was the long range 16-inch aerial-radio-compass position-finding practices fired last spring. The regiment was also an active participant in the joint Army-Navy maneuvers held in February. The regular practices followed the experimental firings. The season was finished off with antiaircraft practices, using the Vickers Director. This demitasse was also highly successful.

The 15th is used to doing things. They didn't know they were winning the trophy but it fell right into their lap. The COAST ARTILLERY JOURNAL congratulates Colonel Grant and the 15th on the outstanding accomplishment of the year.

Trophy Winners

(Continued from page 323)

tension course work accomplished per officer. The Executive Council recently changed the requirements of the competition, effective July 1, 1932. The changes were not radical and consisted in designating *credit hours* of extension course work instead of sub-courses as the unit of measure. The strength of the competing regiments will be taken as of *December 31* instead of June 30. The Council is happy to state that the 955th would have won the trophy if the new regulations had been effective during the past year.

The winner of the National Guard Trophy will be announced at a later date when all records have been received.

COAST ARTILLERY ORDERS

Brig. Gen. Charles E. Kilbourne assigned to duty as Assistant Chief of Staff, War Plans Division, G. S., Washington.

Col. George A. Nugent, 11th, Ft. H. G. Wright, previous orders to I.G.D. revoked.

Col. Russell P. Reeder to sail New York, September 2, for Panama, instead of as previously ordered.

Col. Marcellus G. Spinks, I.G.D., previous orders to Miss. State College revoked.

Lt. Col. Francis J. Behr promoted Colonel July 1.

Lt. Col. Robert P. Glassburn to 51st, Ft. Monroe, instead of as previously ordered.

Lt. Col. Wm. R. McCleary from instructor, Mo. N.G., Carthage, to 14th Ft. Worden, September 30.

Lt. Col. Richard I. McKenney, 11th, Ft. H. G. Wright, to Panama, sailing New York, January 13.

Lt. Col. John P. Terrell retired upon his own application, September 30.

Major Gordon DeL. Carrington detailed to General Staff, Headquarters, First Corps Area.

Major Clarence E. Cotter from duty at Sperry Gyroscope Co., Brooklyn, to 7th, Ft. Hancock.

Major Frank Drake detailed to General Staff, Headquarters, Seventh Corps Area, Omaha, August 2.

Major Raymond H. Fenner promoted Lt. col., August 1.

Major Charles A. French, 62d, Ft. Totten to R.O.T.C., New Bedford High School, Mass.

Major William C. Hanna, retired, physical disability, August 31.

Major Francis P. Hardaway from Panama to Office Chief of Coast Artillery, Washington.

Major William W. Hicks promoted Lt. Col., August 1.

Major Peter H. Ottosen from R.O.T.C., M.I.T., Cambridge, to R.O.T.C., Gloucester High School, Mass.

Major Robert E. Phillips, 11th, Ft. H. G. Wright, to R.O.T.C., Owensburg High School, Kentucky.

Major Jesse L. Sinclair from Panama to instructor, Va. N.G., Lynchburg.

Major Carl J. Smith from Hawaii to R.O.T.C., Reno High School, Nevada, instead of as previously ordered.

Major Eugene B. Walker promoted Lt. col. September 1.

Captain Morris C. Handwerk, 62d, Ft. Totten, to Hawaii sailing New York, December 13.

Captain John L. Hayden promoted major, September 1.

Captain Harold R. Jackson promoted major, July 1.

Captain Robert W. McBride from R. O. T. C., U. of Ill., Urbana, to R. O. T. C., Joliet Township High School, Illinois.

Captain Lucas E. Schoonmaker from Hawaii to 69th, Ft. McClellan.

Captain Cyrus Q. Shelton from duty

with War Mothers Pilgrimage, New York, to 6th, Fort Winfield Scott, sailing New York, November 9.

Captain James H. Smith from Hawaii to 14th, Fort Worden.

Captain Charles H. Stewart, Fitzsimons General Hospital, to home and await retirement.

Captain Philip B. Taliaferro from R. O. T. C., Ga. Tech., Atlanta, to Panama, sailing New York, January 13.

Captain Joseph H. Twyman retired July 31.

Captain Henry W. Ulmo from Panama to 11th, Ft. H. G. Wright.

1st Lt. Russell E. Bates from R. O. T. C., Michigan State College, East Lansing, to Hawaii, sailing New York, December 13.

1st Lt. Orley D. Bowman promoted captain July 1.

1st Lt. Wilbur R. Ellis from instructor, C. A. S., Ft. Monroe to 2d, Ft. Monroe, September 10.

1st Lt. Forrest J. French from R. O. T. C., University of Cincinnati, to 2d, Ft. Monroe.

1st Lt. John F. Gamber from detail in O. D. and from Ft. Bliss to 69th, Ft. McClellan.

1st Lt. Wm. E. Griffin, 3d, Ft. Rosecrans, orders to duty as student, C. A. S., Ft. Monroe, revoked.

1st Lt. Malcolm H. Harwell from student C. A. S., Ft. Monroe, to Hawaii sailing New York, October 7.

1st Lt. Raleigh R. Hendrix from Hawaii to 2d, Ft. Monroe.

1st Lt. Paul C. Howe, 61st, Ft. Sheridan, to R. O. T. C., Rockford High School, Ill.

1st Lt. John H. Madison from R. O. T. C., Kansas State College, Manhattan to Panama, sailing New York, January 13.

1st Lt. Floyd A. Mitchell, student C. A. S., Ft. Monroe, to student M. I. T., Cambridge, September 15.

1st Lt. Henry F. Myers from Philippines to 2d, Ft. Monroe.

1st Lt. Robbin B. Pape sailing for Hawaii July 27, thence to Japan September 29.

1st Lt. Warren C. Rutter from Recruiting, Denver, to 69th, Ft. McClellan.

1st Lt. Harold W. Smith promoted captain July 1.

1st Lt. Rupert E. Starr, 14th, Ft. Worden to R. O. T. C., San Francisco High School, Calif.

1st Lt. Henry K. Williams, Jr., from Hawaii to 6th, Ft. Winfield Scott.

1st Lt. George E. Young from Panama to 51st, Fort Monroe.

2d Lt. John B. Ackerman, U. S. M. A., 1932, to 63d, Fort MacArthur.

2d Lt. Gilbert N. Adams, U. S. M. A., 1932, to 14th, Ft. Worden.

2d Lt. Charles K. Allen, U. S. M. A., 1932, to 62d, Ft. Totten.

2d Lt. Arthur H. Bender promoted 1st Lt. July 1.

2d Lt. Wallace H. Brucker, U. S. M. A., 1932, to 52d, Fort Monroe.

2d Lt. Robert G. Butler, jr., 11th, Ft. H. G. Wright, detailed in O. D. and to Aberdeen Proving Ground, August 20.

2d Lt. Wm. A. Call to sail from New York to Philippines August 26, instead of November 9.

2d Lt. Edgar N. Chace, U.S.M.A., 1932, to 52nd, Fort Monroe.

2d Lt. William S. Coit, U. S. M. A., 1932, to 6th, Ft. Winfield Scott.

2d Lt. James H. Cunningham, jr., U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Leo P. Dahl, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. William V. Davis, promoted 1st Lt. June 1.

2d Lt. Philip V. Doyle, U. S. M. A., 1932, to 52d, Fort Hancock.

2d Lt. Christian F. Dreyer, U. S. M. A., 1932, to duty as Assistant to Constructing Quartermaster, Mitchel Field.

2d Lt. Dwight D. Edison, U. S. M. A., 1932, to Hawaii.

2d Lt. Edward E. Farnsworth, jr., U. S. M. A., 1932, to 62d, Ft. Totten.

2d Lt. Norman R. Ford, U. S. M. A., 1932, to 11th, Ft. H. G. Wright.

2d Lt. Albert G. Franklin, jr., promoted 1st Lt., August 8.

2d Lt. Robert T. Frederick from Panama to 6th, Ft. Winfield Scott.

2d Lt. Harrison A. Gerhardt, U. S. M. A., 1932, to 63d, Ft. MacArthur.

2d Lt. Robert D. Glassburn, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Donald L. Hardy, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Thomas H. Harvey, U. S. M. A., 1932, to Hawaii.

2d Lt. Lauri J. Hillberg, U. S. M. A., 1932, to 51st, Ft. Monroe.

2d Lt. John J. Hutchison, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Dwight B. Johnson, U. S. M. A., 1932, to 61st, Ft. Sheridan.

2d Lt. George E. Keeler, jr., from Panama to 63d, Ft. MacArthur.

2d Lt. Aaron M. Lazar, U. S. M. A., 1932, to Panama.

2d Lt. Francis A. Liwski, U. S. M. A., 1932, to Hawaii.

2d Lt. Archibald W. Lyon, U. S. M. A., 1932, to duty as assistant to Constructing Quartermaster, Hamilton Field, Calif.

2d Lt. Henry G. McFeely, U. S. M. A., 1932, to Hawaii.

2d Lt. Howard R. Martindell, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. William Massello, jr., U. S. M. A., 1932, to 11th, Ft. H. G. Wright.

2d Lt. Stephen M. Mellnik, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. John E. Metzler, U. S. M. A., 1932, to 2d, Fort Monroe.

2d Lt. Robert F. Moore, U. S. M. A.,

1932, detailed in Air Corps and to Randolph Field.

2d Lt. Russell M. Nelson, U. S. M. A., 1932, to 62d, Fort Totten.

2d Lt. Milton L. Ogden, U. S. M. A., 1932, to Hawaii.

2d Lt. Byron L. Paige, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Irving D. Roth, U. S. M. A., 1932, to 52d, Fort Hancock.

2d Lt. Robert Roth, student, C. A. S., Ft. Monroe, to student, University of Michigan, Ann Arbor, September 15.

2d Lt. Walter A. Rude, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Sam C. Russell, U. S. M. A., 1932, to 61st, Fort Sheridan.

2d Lt. Robert E. Schukraft, U. S. M. A., 1932, to Panama.

2d Lt. Carl M. Sciple, U. S. M. A., 1932, detailed Assistant to Constructing Quartermaster, Bolling Field.

2d Lt. Clifford McC. Snyder, U. S. M. A., 1932, to 14th, Ft. Worden.

2d Lt. Erven C. Somerville, U. S. M. A., 1932, to 13th, Ft. Barrancas.

2d Lt. Arnold Sommer, U. S. M. A., 1932, to the Philippines.

2d Lt. Daniel S. Spengler, U. S. M. A., 1932, to 61st, Fort Sheridan.

2d Lt. William F. Spurgin, U. S. M. A., 1932, to 13th, Fort Barrancas.

2d Lt. John C. Steele to sail from New York for Hawaii, August 20, instead of October 7.

2d Lt. Preston Steele, U. S. M. A., 1932, to 6th, Ft. Winfield Scott.

2d Lt. Stanley R. Stewart, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Alden P. Taber, from Hawaii to 14th, Fort Worden.

2d Lt. Benjamin J. Webster, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Charles E. Wheatley, jr., U. S. M. A., 1932, to 51st, Fort Monroe.

2d Lt. Robert L. Williams, jr., U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Torgils G. Wold, U. S. M. A., 1932, detailed in Air Corps and to Randolph Field.

2d Lt. Frederick R. Young assigned to 51st, Fort Monroe, instead of 2d, Fort Monroe.

2d Lt. Layton A. Zimmer from Hawaii to 52d, Fort Monroe.

Warrant Officer John E. McSweeney, Chief Engineer, A. M. P. S., H. D. of Cristobal to H. D. of San Francisco.

Warrant Officer Silas H. Emory, Fort Hancock, to Aberdeen Proving Grounds.
Master Sgt. John C. Fern, Hd. Company, P. C. D., Fort Amador, retired, August 31.

Master Sgt. Thomas C. Merryman, 7th, Fort Hancock, retired, August 31.

Master Sgt. Orlando S. Romans, 5th, Ft. Totten, retired, August 31.

Master Sgt. John Waldron, D. C. N. G., Washington, retired, August 31.

1st Sgt. Samuel L. Dunn, 2d, Fort Monroe, retired, August 31.

1st Sgt. Alfred M. Goodie, 2d, Fort Monroe, retired, July 31.

1st Sgt. James H. Harp, 14th, Fort Worden, retired, August 31.

1st Sgt. Readdy Lockaby, 2d, Fort Monroe, retired, July 31.

1st Sgt. Robert F. O'Donnell, 4th, Fort Amador, retired, August 31.

1st Sgt. Frederick Perry, 9th, Fort Banks, retired, August 31.

1st Sgt. Elmer O. Robison, 59th, Fort Mills, retired, July 31.

1st Sgt. Samuel Walters, 2d, Fort Monroe, retired, August 31.

Tech. Sgt. Jules C. Lacock, Band, 63d, Ft. McArthur, retired, August 31.

Tech. Sgt. William Ruksztelis, 3d, Ft. Story, retired, August 31.

Society of the
SONS OF THE REVOLUTION
In the Commonwealth of Massachusetts
Office of the President

October 22, 1932.

Major General John W. Gulick,
Chief of Coast Artillery,
Washington, D. C.

My dear General:

Your letter to me of January 21, 1932, suggested that we add to our Knox Trophy medals one for the noncommissioned officer making the best record at the Coast Artillery School.

On October 19th, our Board of Managers adopted your suggestion with thanks to you for bringing the matter to their attention. A medal will be provided for that purpose and our Knox Trophy Committee will communicate with you later. We rely on you to make such rules as you deem best for ascertaining the noncommissioned officer who is entitled to this medal, and no doubt you will be able to designate the one to receive the medal to be presented at our annual dinner in January.

Thanking you for your interest in this matter, I remain

Very respectfully,

JOHN B. RICHARDS,

President.

BOOK REVIEWS

WORLD STATES OF THE MACHINE AGE, Capt. Woodbern E. Remington, Infantry. Gilbert Printing Company, Columbus, Georgia, 1932.

"World States of the Machine Age," a brilliant discussion of conditions of the present day, by Captain Woodbern E. Remington, and released by a local printing company a few days ago, has a triple claim to interest of Columbus people. As the most ambitious undertaking of the Columbus printing company, it would alone attract favorable attention; as the work of a Fort Benning officer who this winter made his home in Columbus, it will create further interest; for its clear cut analysis of world conditions of today, it will challenge the thought of thinking people.

"World States of the Machine Age" carries a foreword by Major General Campbell King, commandant of Fort Benning, in which he says, "The subject matter is one which vitally concerns the future economic and political status of mankind. The discussion is predicated upon a broad background and shows an extraordinary degree of scholarly research. It is a book which should be carefully read and seriously pondered by all those who are concerned with the amelioration of the present conditions which confront the civilized world. I congratulate the writer heartily on the brilliant analysis he has made of these conditions and the remedies, both political and economic, which he discusses as necessary to cope with the complications incident to the development of the Machine Age."

In his preface Captain Remington lifts the guilt for the present international chaos from the Great War, which he says was but "a phase of a tremendous world-wide social upheaval—the attempt of humanity to adjust itself to the Machine. Those extensive organizations of humanity, necessitated by the Machine Age, will be shaped on racial lines. It is with these new social organizations which we have termed 'World States,' that we are now concerned. Until they are finally consummated, we must continue to undergo such periods of industrial depression and political unrest as we are now experiencing."

In a scholarly review of Captain Remington's book, which for lack of space we cannot publish in full, Major Truman Smith says:

"Captain Woodbern E. Remington, Infantry, U. S. A., a Harvard man and a soldier by choice, has recently published a book of unusual significance for our changing World, and which will be of equal interest to soldiers, scientists and scholars.

"Captain Remington urges, as a preliminary step toward World unity, the coalescence of those nations, akin by custom, ideals and blood relationship, into super states; for instance a Latin America, a Slavia, a Mediterranean empire, a Far Eastern Mongol state.

THE UNITED STATES COAST ARTILLERY ASS'N. BALLOT

For President (1933-34)

Major General John W. Gulick,
Chief of Coast Artillery
Vice Major General John W. Gulick

For Members of the Executive Council (1933-34)

Brig. Gen. J. J. Byrne, N. Y. N. G.
Vice Brig. Gen. Howard S. Borden

Lt. Col. F. S. Tenney, 955th C. A. (Duluth)
Vice Col. Bowman Elder

Major E. B. Gray, C. A. C.
Vice Capt. J. H. Wilson

Major Stewart S. Giffin, C. A. C.
Vice Major Stewart S. Giffin

.....
Signature

.....
Rank and Organization

.....
Address

INSTRUCTIONS AND INFORMATION

1. Listed above appear the names of candidates for members of the Executive Council of the U. S. Coast Artillery Association to replace those members whose terms expire with the year 1932.

2. The candidates were selected by a Nominating Committee appointed by the President of the Association.

3. Each candidate was considered in connection with the geographic location of his residence and also the component of which he is a member. It was considered advisable to have at least five members of the Council resident in Washington in order to facilitate the transaction of business.

4. No member is to be deprived of a voice in the nomination and selection of the new members. If you do not approve of the Committee's choice, enter your personal choice in the space provided.

5. Indicate your choice by check mark or by writing in the name of your candidate. Ballots received with signatures but no other indications will be considered proxies.

6. Ballots received later than January 9, 1933, will not be counted.

7. Mail ballots to The Secretary, U. S. Coast Artillery Association, 1115 17th St., N. W., Washington, D. C.

Such coalescences in addition to serving a distinct purpose in this machine age would constitute definite progress towards world unity.

"Remington is conservative in his program for the future. Rejecting visions of leagues and world super states all at once as the dreams of impractical idealists, he urges the creation of tariff unions by blood related states. For America and England, he demands an economic alliance into which will also be admitted the Scandinavian and Teutonic countries. Such an economic alliance, Remington suggests, should be based on a system of tariff preferences and trade agreements, much along the lines which the British empire proposes to discuss at the coming Ottawa conference. If Dutch South Africa, French Canada and Anglo-Scotch New Zealand can come to an economic agreement, Remington sees no insuperable obstacles to a similar agreement among racially allied English, Swedes, Teutons and Americans.

"It has already been suggested that racial blood kinship is to be the cementing tie in these race-nations of the future. However, the life blood of these states is to be its internal trade.

"There is no one who has tasted the economic absurdities of the Danubian states as created by the peace treaty, who does not realize how obsolescent the nationalism of small states has become in this machine age. What reason is there, in the efforts of nations such as Denmark and Austria to become economically self-sufficient in an age when the two hemispheres are scarcely a day apart by aeroplanes? Remington believes, and this reviewer shares his belief, that if nationalism is to survive, the small nations must be amalgamated into economically self-sustaining blocks. That feeling which we now understand as patriotism must in the future strictly limit itself to a love of one's locality. Our present feeling of patriotism must be transferred from the 'nation' to the 'racial group.'

"The formation of such superstates, if it can be accomplished, will inevitably lead on to world unity."

"World States of the Machine Age" is written in a clear, readable style. It is to be placed on the shelves of the larger libraries of the country.—*The Ledger-Enquirer*, Columbus, Georgia.

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BETWEEN THE BIG PARADES, by Franklin W. Ward. New York: Frederick M. Waterbury, 1932. 284 pages. \$2.50.

One of the most widely known National Guardsmen in the country is the author of this work. He has added a real contribution to the history of the American Expeditionary Forces in France. It is essentially the story of an infantry division's human elements in war, with refreshing individual bisections predominating.

The word pictures are unusually well done many of the events related standing out like snapshots. At times the reader becomes, as the author indicates, an

MILITARY BOOKS

Coast Artillery Journal

is the largest producer
and distributor of military
books in America

If you need an up-to-date book on any phase of the military art you can probably find it in the list of our publications on the inside of the front cover.

If you need any book on any military or allied subject, that is not in our list, we can obtain it at a saving to you.

If you need a book of any kind, fact or fiction, we can get it for you at the best possible price.

If you are not sure just what book you want we should be glad to advise you as to the book that will best meet your need.

If you need stationery of any kind, remember that we are stationers to the Army.

If you want any magazine or magazines, send us the names. We will enter your subscription at the lowest rates. We guarantee to meet any price quoted by any responsible agent.

SO IN ANY CASE: If you need books, magazines or stationery.
WRITE TO US.

See inside front cover for a list of our principal publications.

Coast Artillery Journal
1115 17th Street, N. W.
WASHINGTON, D. C.

MAGAZINES

STATIONERY

WHAT THE COAST ARTILLERY HAS BEEN WAITING FOR!

Gunners' Instruction PAMPHLETS

The COAST ARTILLERY JOURNAL is pleased to announce that it is about to issue a complete set of up-to-date instruction pamphlets covering the prescribed scope of gunners' examinations for all Coast Artillery units, as set forth in Training Regulations 435-310 (Examination for Gunners).

These pamphlets will be conveniently arranged to meet the needs of all classes of personnel, and will be furnished at very moderate prices which will be announced as the pamphlets appear.

The first of these pamphlets, covering the instruction of 2nd Class Gunners in Antiaircraft Artillery units will be issued during November, 1932.

Information furnished upon request.

The Coast Artillery Journal
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imaginary wayfarer on the road to Ronssoy in France, who will watch that which as a fanciful observer he is to witness.

Replete with exploits, adventures and misadventures in which wit and humor dominate, there is closely woven into the fabric many incidents that pierce the depths of pathos and tragedy. The descriptions of the minutia of long fatiguing marches of infantry through rain and mud; building up a combat line, long battle action, and in the end practical exhaustion; are comparable with the very best that military literature has produced.

The author deals with the abstract and withal philosophic atmosphere of fighting men, and sounds notes that come only from the hands of men of observation who have served and marched and lived amongst them.

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THE COMING OF SOUTH AMERICA, by Henry Kittredge Norton. Published by the John Day Company, New York, 1932. 300 pages. Price \$3.50.

It would probably be safe to make the statement that the average citizen of the United States says, "Latin America"—and immediately visualizes revolutions, bananas, Sandino and our own U. S. Marines, the entire conglomeration being somewhere south of the Rio Grande River and Tia Juana! In this volume Mr. Norton dissipates the fog. As a representative of the Carnegie Endowment for International Peace, the distinguished author has recently spent many months in South America studying political and economic developments in the leading South American countries, and here records his "reflections and analyses."

Argentina, Bolivia, Brazil, Chile and Peru are all great countries, each one with an individuality of its own, and all resentful at being classed simply as "Latin America." Each one has a different internal problem and maintains different relations with each other and with the United States. The author notes that at present there is considerable ill-will shown towards the United States, due to the more or less crude manner in which our financiers handled the numerous postwar loans made with them. Mr. Norton records briefly the revolutions of the past two years and discusses the internal political, social and economic problems. He makes an estimate of the trends of development in each country, and forecasts their political, cultural and economic relations with the United States.

It is plainly apparent to all students of international affairs that eventually there will be much closer union between the countries of the Americas, North and South, than exists today, and for the reason Mr. Norton's book is most appropriate at this time. It is recommended to all officers.